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On the nature of the transition in the value of children

Rodolfo A. Bulatao

EAST-WEST CENTER
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CURRENT STUDIES ON THE VALUE OF CHILDREN is a subseries of PAPERS OF THE EAST-WEST POPULATION INSTITUTE. It presents analyses of data from the Value of Children project, a cross-national study of parents' perceptions of the satisfactions and costs of children, and findings from similar studies.

All papers in Current Studies will be assigned the number 60, to indicate that they are part of Papers of the East-West Population Institute. The serial number for each subseries paper, however, will include a letter suffix (A, B, etc.) designating its sequence in the subseries.

Editor: *James T. Fawcett*

CURRENT STUDIES ON THE VALUE OF CHILDREN

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Rodolfo A. Bulatao

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PREFACE

A shorter version of this paper was presented at the Conference on Comparative Fertility Transition in Asia, held in Tokyo in March 1978. Data for the study were collected as part of a cross-national project, described in the Foreword, which also identifies the other investigators and the funding sources.

EDITOR'S FOREWORD

This paper is the first in a new subseries of Papers of the East-West Population Institute, entitled Current Studies on the Value of Children. The subseries will consist mainly of comparative analyses of data from the Value of Children (VOC) project, a cross-national study of parents' perceptions of the satisfactions and costs of children. Also included will be summaries of findings from individual countries in the VOC project, as well as reports based on studies that are not part of the project but have a similar focus.

The VOC project began in 1972 and was carried out in two phases. The first phase consisted of interviews with relatively small samples of parents in six countries. Results of the first phase of the project have been reported elsewhere.[1] In the second phase, which is the focus of this subseries, interviews were conducted with larger samples of husbands and wives–in most cases nationally representative samples–in eight countries. These surveys were carried out in Indonesia, the Republic of Korea, the Philippines, Singapore, Taiwan, Thailand, Turkey, and the United States.[2] In addition, a special study of wives with one child in the West German state of Bavaria was included in the second phase research.[3] The surveys in these nine countries were conducted during the period from January 1975 to March 1977.

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[1] Comparative results for all six countries are reported in Fred Arnold and others, The Value of Children: A Cross-National Study, Vol. 1, *Introduction and Comparative Analysis* (Honolulu: East-West Population Institute, 1975). Separate reports for each country are also available or projected in the same series (Vols. 2–7).

[2] Coinvestigators from these eight countries were involved in the project from the outset and participated in the design and pretesting of the core questionnaire; they also had responsibility for the conduct of the research in their own countries. The coinvestigators were: Masri Singarimbun and Russell K. Darroch (Indonesia); Sung Jin Lee (Republic of Korea); Rodolfo A. Bulatao (Philippines); Peter S.J. Chen, Betty Jamie Chung, and Eddie Kuo (Singapore); Tom T.H. Sun and Tsong-Shien Wu (Taiwan); Chalio Buripakdi, Nibhon Debavalya, and Visid Prachuabmoh (Thailand); Cigdem Kagitcibasi (Turkey); Lois W. Hoffman, Fred Arnold, and James T. Fawcett (United States). Support for the studies in these countries and for the comparative analysis was provided by the East-West Population Institute, the International Development Research Centre, the Ford Foundation, the Rockefeller Foundation, the Smithsonian Institution, the Research Institute for the Study of Man, and the U.S. National Institute for Child Health and Human Development.

This foreword provides an overview of the content and methodology of the second phase of the VOC project. The overview contains sufficient background, we believe, for most readers of the papers in the subseries. For researchers interested in greater detail, however, selected Technical Notes are available on request from the EWPI Publications Office. These reports, prepared by Rodolfo A. Bulatao and Constancia Angeles, provide information about the questionnaire (Technical Note No. 5), the comparative codebook (No. 2), sampling procedures (No. 4), and survey procedures (No. 6).

In the sections that follow, general information is provided about the purpose, content, sampling procedures, and research methodology of the VOC project.

Purpose and content

The objective of the VOC project is to develop new knowledge about childbearing motivations and the relationship of these motivations to family size preferences and fertility. An assumption of the study is that perceptions of the satisfactions and costs of children have an important influence on decisions about family size. Thus survey measurements in the study are designed to assess attitudes and values related to the variety of satisfactions derived from children and the costs involved in rearing them. Also measured are perceptions of alternative sources of satisfaction, as well as diverse background factors and mediating variables. With this rich set of data, analyses are directed toward understanding the determinants and consequences of fertility behavior among different social and cultural groups at various stages of the life cycle.

The project reflects a conceptual approach that is basically utilitarian–i.e., it is concerned with the value of children *to parents.* Social, cultural, and biological values of children are not ignored, but the survey method necessitates that these dimensions be measured through the filter of parental perceptions. Other research approaches, such as community studies and assessments of actual economic costs and benefits, are useful and complementary in providing different perspectives on the value of children.

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[3] The West German study was added to the VOC project after the core questionnaire had been designed. A modified version of the questionnaire was developed for West Germany by coinvestigators Esther R. Mechler, Andrejs Urdze, and Brian R. Flay. Support for the study was provided by the Deutschen Forschungsgemeinschaft and the Rockefeller Foundation.

The VOC project is especially indebted intellectually to work in the fields of psychology and economics.[4] But as the project has evolved and as the cross-cultural data have been examined, a research perspective has been developed that differs from the earlier psychological or economic approaches, yet retains elements from both of them and from other work in sociology and demography. This evolution and the potential for convergence are discussed in a number of recent publications,[5] including the present paper.

Our interest in the value of children is not purely academic, although it should be noted that there has been until recently remarkably little basic research on motivations for childbearing. A major impetus for the project was concern about rapid population growth and the need to develop new ideas for public policies that might influence growth rates. Such policies are essentially efforts to alter societal patterns of fertility motivations. Empirical data about the nature of those motivations, their variations across groups, and their relationships to other desires and value orientations should be of obvious benefit in the formulation of population policies and programs. Our procedures for obtaining such data are described in the following sections.

Questionnaire, sampling, methodology

The questionnaire used for the large-scale surveys was similar in many respects to the one designed for the first phase of the project, but it was improved through experience and expanded to cover topics not included in the earlier research. Parts of the questionnaire were devoted to standard social, economic, and demographic information about the respondent and the household. I will not discuss those here but will review, in summary form, the portions more directly relevant to assessing the value of children.

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[4] The most influential sources were Lois W. Hoffman and Martin L. Hoffman, "The value of children to parents," in James T. Fawcett, ed., *Psychological Perspectives on Population*, pp. 19–76 (New York: Basic Books, 1973); and Richard A. Easterlin, "Towards a socioeconomic theory of fertility: a survey of recent research on economic factors in American fertility," in S.J. Behrman and others, eds., *Fertility and Family Planning: A World View*, pp. 127–56 (Ann Arbor: University of Michigan Press, 1969).

[5] See, for example, Fred Arnold and others, *op. cit.*, and James T. Fawcett, "The value and cost of children: converging theory and research," in Lado T. Ruzicka, ed., *The Economic and Social Supports for High Fertility*, pp. 91–114 (Canberra: Australian National University, 1977).

In format, the questions included structured and unstructured items and combinations of the two. Quantitative scaling of responses was used extensively, but qualitative data were also obtained from open-ended questions and were analyzed through content analysis. In general, we tried to use more than one type of measurement for dimensions of the value of children that we considered important. The content of the questionnaire was decided upon in workshops involving all of the investigators. Pretesting of various versions of the questionnaire in all countries resulted in extensive modifications. Rigorous procedures for translation and back-translation were used in most countries, to assure conceptual equivalence of the items.

The tables in this first comparative paper illustrate results obtained from various questionnaire items, with emphasis on responses to open-ended questions on the advantages and disadvantages of having children. Other types of questions were used to measure the value of children in general, the next child, certain numbers of children, male and female children, and so on. In addition, questions were included to compare the value of children with the value to the respondents of other objects, activities or goals. Following is a summary of the questionnaire items that dealt specifically with the value and cost of children:

Open-ended questions

Advantages and disadvantages of having children, compared with not having any children

Reasons for not wanting more or fewer than the respondent's desired number of children

Reasons for wanting sons and daughters

Qualities desired in sons and daughters when they are grown

Feelings about having only one child

Children as a means to fulfill life values rated as important by respondent

Aspects of raising children that entail the greatest expense

Aspects of raising children that cause worry and emotional strain

Activities of respondent that are curtailed or precluded by having children

Ways in which a person's life is changed by having children

Structured questions

Reasons for wanting or not wanting another child (22 items)

Preferred sex composition among children

Importance for the child of having siblings

Qualities desired in children (5 items)

Contribution of sons versus daughters to life values rated as important by respondent

Contribution of small versus large number of children to life values rated as important by respondent

Age at which children provide the most happiness for parents

Satisfactions provided by having children (19 items)

Expectations concerning economic or practical help from sons and daughters (5 items)

Perceived economic burden of different numbers of children

Age at which a child is most costly

Whether a son or daughter is more costly

Degree of worry and emotional strain caused by children

Whether a son or daughter causes more worry and emotional strain

Extent to which children interfere with other activities

Ranking of four types of costs of children

The classification scheme for values and disvalues presented in Bulatao's paper represents one way of organizing the diverse dimensions of the value of children within a coherent framework (see p. 7). The numerous response categories are indicative of the wide range of variables assessed, covering areas that might be broadly characterized as psychological, social, and economic. The qualitative data from the project were coded in highly specific categories to allow rearrangement of the responses to fit various conceptual or theoretical schemes.

Sampling procedures

Samples for the survey in phase two of the VOC project were designed to be large enough to permit analysis of various subgroups and to be nationally representative where possible, to allow generalizations about the country as a whole. Married women in the childbearing years were the main target group, but a subsample of husbands was also interviewed in each country except West Germany. The size of these subsamples ranged from about one-quarter to about one-half of the number of wives interviewed.

Decisions about the details of sample size and sampling procedures were left to the investigators in each country, most of whom had the assistance of sampling consultants. Stratified, multi-stage samples were drawn in all countries, utilizing systematic random selection or simple random selection procedures. Excluding West Germany, the number of wives interviewed ranged from 977 to 2,614; the number of husbands, from 382 to 1,311. In all, more than 20,000 respondents were interviewed in the second phase of the VOC project (14,723 wives and 5,681 husbands). The upper age limit for wives was 39 in most countries, but 40 in Singapore and 44 in Taiwan.

National representativeness was the aim in all countries except Indonesia and West Germany, although certain areas were excluded in several countries, for such reasons as accessibility and security problems. The Indonesian sample was designed to provide comparison of two major ethnic groups, the Javanese in Central Java and the Sundanese in West Java. The West German sample was limited to a sample of 296 young wives with only one child in the state of Bavaria; in contrast to other countries, the VOC study in Germany was designed with the primary aim of providing insight into the reasons for a declining birth rate and an increase in the prevalence of one-child families.

Further information about the type of sample in each country is provided in Table 3 of this paper; additional details about selection procedures and other matters are available in VOC Technical Note No. 4.

Research procedures

The principal investigator in each country had responsibility for organizing the fieldwork and setting up procedures for coding and checking data. A common framework for research procedures was agreed upon at three workshops of coinvestigators that were convened at various stages of the project, but detailed arrangements for implementation of the research varied from country to country.

The core questionnaire was augmented in most countries with items of particular interest to the investigator or deemed useful in the cultural context. Translations of the English core questionnaire were necessary in all countries but the United States and were usually carried out with independent back-translations and other procedures for ensuring conceptual equivalence. Translations were not always satisfactory, however, which is not surprising in view of the complexity of the task. In the Philippines translation into ten dialects was required, for example, and in Indonesia the questionnaire was translated first into Bahasa Indonesia and then from that language into Javanese and Sundanese. The research results are undoubtedly distorted to some extent by translation difficulties, but we believe this is not a major problem for most items in the questionnaire.

Interviewers were in most cases college students or college graduates and most were women. Male interviewers (in addition to females) were employed in Indonesia, the Philippines, Thailand, and Turkey. Housewives with at least a high school education were employed in Taiwan, and many of the interviewers in the United States were housewives employed part-time by a survey research organization. In both Taiwan and the United States most of the interviewers had prior experience in other research projects.

The length of training sessions for interviewers ranged from a few days to two weeks. In all cases training included practice interviews, and role-playing was often a part of the training. Detailed interviewers' manuals and questionnaire guides were prepared in each country, based partly on the documents used in the first phase of the research, and in some cases on materials compiled by the University of Michigan's Survey Research Center for the second-phase U.S. study (which was the first study to go into the field). The sharing of training manuals and other materials was another means, in addition to workshops, for enhancing comparability among countries.

All countries made arrangements for close supervision and editing and checking of work done by interviewers. Often editing was done while the team was still in the field, to facilitate corrections or reinterviews. Such supervision led in a number of cases to interviewers being dismissed and their work being discarded. Throughout the project, emphasis was given to quality of data collection procedures.

Similar emphasis was given to quality of coding procedures, especially for open-ended questions. In nearly all countries independent double-coding was employed, in some cases for all questionnaires, in others for a sample of questionnaires, and in still others for selected items on the questionnaire. The usual computer checks for consistency and errors were run on the data after coding.

Initially data files were prepared for each country separately. These data files, along with codebooks, were then forwarded to the project coordinator, Rodolfo A. Bulatao, for compilation into a single data file. The compilation required transformation for much of the data, since coding procedures, although similar, were not identical across countries. The comparative data file was separately checked for consistency and errors. These data should be essentially accurate and valid, in view of the care taken in data collection and coding. Nonetheless, in a project as large as this one, with interviews conducted in a variety of cultural settings, some errors and variations in meaning of responses are bound to have occurred. Where similar patterns and trends are shown across a number of countries and subgroups, however, we feel that the data can be interpreted with a high degree of confidence.

Current Studies on the Value of Children

Most of the papers in this subseries will draw upon the comparative data from the VOC project, as noted earlier. These reports will be prepared by the coinvestigators in the VOC project and their associates. In addition, we will welcome the submission of manuscripts from persons not connected with the VOC project who have carried out similar studies. We are aware of numerous such studies in countries around the world, and we would be pleased to enrich this series by including papers that deal with the same topic but reflect different conceptual, methodological, or cultural perspectives.

James T. Fawcett

ABSTRACT A review of explanations for the fertility transition identifies two factors not related to the demand for children, contraceptive availability and delayed marriage, and five factors related to demand. This paper evaluates the five demand factors–mortality reduction, rising aspirations, vanishing economic roles for children, the emergence of the conjugal family, and weakening cultural props for high fertility–by comparing the values and disvalues parents attach to children in seven Asian countries and two Western countries at different stages in the fertility transition. Both open-ended and structured measures of values and disvalues are utilized. Comparisons are also made across areas within two countries, and between parents limiting themselves to small families and parents with large families who have no intentions of family limitation. The pattern of values essentially supports the economic explanation, disconfirms the cultural explanation, and provides partial support for the other explanations.

Although demographic transition theory has been characterized as a historical generalization in search of an explanatory principle, writings on the transition have in fact offered a plethora of explanations for fertility decline. In this paper I attempt to distinguish several major explanatory factors that others have touched on, focus on those factors that involve changes in the desire for children, and determine if cross-sectional survey data on parents' perceptions of the values and disvalues of children in seven Asian countries (and two Western countries for comparison) are consistent with the operation of these explanatory factors. The paper thus provides a way of organizing and interpreting the increasing data being collected on the value of children to parents.

In 1967 Concepción and Murphy denigrated demographic transition theory: "The theory is not a theory but a description of a series of historical events that have occurred with some regularity. . . . Demographers have proclaimed a theory when there is no theory. There is only a crying need for a theory" (1967:6). What Concepción and Murphy considered recent theoretical beginnings and labeled "technology theory" were little more than rationalizations for family planning programs: "All the world is anxious for lower fertility but does not know how to go about it" (p. 9). In 1971 Tabbarah also maintained that demographic transition theory, although describing when and in what pattern birth rates fall in different countries, gives "no explanation of why that decline took place" (1971:258).

Although several of the authors who first identified demographic stages in the historical evolution of societies (Thompson, 1928; Blacker, 1947) may not have spent much time on the reasons for fertility decline, explanations in fact antedate the formulation of transition theory (e.g., Landry, 1909, 1934; Stix and Notestein, 1940). Before Notestein introduced the term "demographic transition" (1945: 41), the debate about physiological causes of the decline had been generally settled. Assessments of the causal impact of modern contraceptives had also reached conclusions that have remained largely unchanged since then: that "modern birth control is as much the result of new interest in family limitation as its cause," according to Stix and Notestein (1940:150)–a balanced view that is difficult to fault today. The most important factors in fertility decline, according to Notestein (1953:18) were

> the growing importance of the individual rather than the family, and particularly the extended family group; the development of a rational and secular point of view; the growing awareness of the world and modern techniques through popular education; improved health; and the appearance of alternatives to early marriage and childbearing as a means of livelihood and prestige for women.

These factors had the greatest force, he added, in urban-industrial society. Here is a whole series of explanations containing, according to Caldwell (1977:30) "almost in mature form," the seeds of all later theoretical developments. If this effort does not qualify as theory under Concepción and Murphy's criteria of "extracting the fundamental processes of a phenomenon and identifying the crucial variables" (1967:6), the reason must be the acknowledged abundance of explanations rather than their scarcity.[1]

To deal with this abundance, and with the elaborations, reorientations, restatements, and reconceptualizations provided by later writers, it is convenient to abstract a few basic explanatory factors that underlie the superstructure of theory. This is not the same thing as the common practice of identifying the crucial variables. That exercise often leads to lists that include women's education, men's education, women's wages, men's wages, family income, and infant mortality (which Schultz [1976] has identified as the essential variables in microeconomic fertility theory), or variables like literacy, life expectation at birth, primary school enrollment, male labor force in nonagricultural pursuits, urbanization, hospital beds, newspaper circulation, telephones installed, secondary school enrollment, and gross domestic product (which Oeschli and Kirk [1975] use to identify transition thresholds). Such variables cannot explain the historical fertility decline unless some intermediate links can be forged to individual fertility-related behavior; and these links, often though not necessarily social-psychological, are what I seek under the rubric of explanatory factors.

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[1] Jones (1977:9) describes sociological fertility theory as "a broad descriptive framework and a mass of *ad hoc*, partial explanations which have some relevance and validity but whose very eclecticism is seen by some as a standing rebuke to the profession and by others as simply consistent with the complexity of the phenomena being studied." More than eclecticism, it would appear that some demographers have failed to see theory in these explanations because they form no simple paradigm for specifically demographic research (Kuhn, 1970). By contrast, questions about the timing, rate, spread, and demographic components of fertility decline can give, and have given, rise to a whole series of demographic studies.

EXPLANATORY FACTORS FOR THE FERTILITY TRANSITION

For current purposes, I assume there are seven basic explanatory factors:

1. increased contraceptive availability and efficiency
2. delayed marriage
3. mortality reduction
4. rising aspirations
5. vanishing economic roles for children
6. the emergence of the conjugal family
7. weakening cultural props for high fertility

Other classifications of the explanatory factors for the fertility transition may be possible, but this set can be made to cover all the major explanations I am aware of, as will be detailed below.[2] These factors might be seen as intervening between socioeconomic development, modernization, or Westernization (however the process is characterized) and fertility decline, though in appropriate circumstances, and, conceivably, with greater frequency nowadays, these factors may operate independently of large-scale societal transformations.

For Easterlin (1974), fertility determinants operate by affecting the demand for surviving children (not merely for a particular number of births), the potential supply of children (the number that biology and culture produce when no deliberate regulation is evident), or the costs of fertility regulation or family limitation.[3] The seven explanatory factors can fit under these three headings. The first factor, contraceptive availability and efficiency, which is understood here to include not only physical but also psychological availability and use-effectiveness and may also be somewhat stretched to include abortion, obviously affects the costs of family limitation. The second factor, delayed marriage, shall be assumed to be a supply factor. As Coale (1975) argued, the postponement and avoidance of marriage in the European transition was probably not related to any desire to reduce fertility, but to such considerations as the need for economic independence and the desire for separate living quarters. Its effect on fertility, therefore, through postponing childbearing and shortening the socially accepted childbearing period, is probably unrelated, other factors aside, to any desire for fewer children. The third factor, mortality decline, has both supply and demand implications, as will be discussed below. The remaining four factors clearly affect the demand for children.

---

[2] In his interpretation of demographic transition theory, Caldwell identified three of these seven factors as the "mainstream arguments" for high fertility in traditional settings–"high mortality, the lack of opportunities for individual advancement, and the economic value of children" (1977:33). His own theorizing focused largely on the third factor.

For completeness, two factors involved in the fertility transition might be added that, far from explaining the transition, operate simultaneously with the previous seven factors but in the reverse direction to raise fertility. These are (8) improved fecundity (or fecundability due to reduced breastfeeding), which is a supply factor, and (9) higher incomes, which Easterlin treats as affecting demand but which Spengler (1966) treats as distinct. If the effects of income on the other factors–particularly aspirations–are controlled, the direct effect should be to allow couples to afford more children, assuming that children are not an inferior good (Becker, 1960). Table 1 summarizes all nine factors, some of which will be discussed further below.

The relative importance of demand, supply, and family-limitation costs in the fertility transition is difficult to assess. A reasonable, if oversimplified, assumption would seem to be that changes in supply and family-limitation costs are dominant in the early stages of the transition, and changes in demand become important after the early declines (Knodel, 1977; Coale, 1975). At any rate the demand factors account for a significant portion of the decline and are essential to it. As Coale (1973:65) has put it, a prerequisite for a major fall in marital fertility is that "perceived social and economic circumstances must make reduced fertility seem an advantage to individual couples."

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[3] Easterlin uses the term "fertility regulation." The term "family limitation" is preferable, however, because not all types of fertility regulation are relevant. Parity-independent fertility regulation is properly considered a supply factor affecting natural fertility.

TABLE 1 Explanatory factors for the fertility transition

Factor (characterization)	Locus of effect
Increased contraceptive availability and efficiency	Family-limitation costs
Delayed marriage	Supply of children
Mortality reduction (Demographic) Insurance effect Price effect Emotional investment	Supply of children and demand for children
Rising aspirations for self and children (Psychological)	Demand for children
Vanishing economic roles for children (Economic)	Demand for children
Emergence of the conjugal family (Social) Locus of costs and demands Companionate marriage Child-centeredness	Demand for children
Weakening cultural props for high fertility (Cultural) Lineage and kin group Religious and social norms Social status	Demand for children
Improved fecundity	Supply of children
Higher incomes	Demand for children

LINKAGES WITH THE VALUES AND DISVALUES OF CHILDREN

The demand factors should directly affect the values and disvalues of children that parents perceive, producing changes that may be considered the value-of-children transition. The values and disvalues attached to children are typically diverse, including economic concerns, psychological satisfactions, and social rewards. They are also considerably variable, being occasionally different for sons and daughters, for first-born, second-born, and later children, for younger and older children, and so on. Finally, they tend to be deeply felt and strongly held. For current purposes, a classification of values and disvalues shall be used that is based on theoretical distinctions (e.g., L.W. Hoffman and M.L. Hoffman, 1973) as well as on cross-cultural findings derived from a variety of survey questions (Arnold and others, 1975; Bulatao, 1975). The three major clusters of values of children, in this classification, are: instrumental assistance from children, covering the uses—economic, practical, kin-group strengthening, status-providing–to which children can be put; rewarding interactions with children, covering the socioemotional rewards, companionship, friendship, and fun that children generate; and psychological appreciation of children, covering the psychological impact of children on parents. The four major clusters of disvalues are: direct financial costs of children; childrearing demands other than the financial, covering the added work, the strain, and responsibility; restrictions on parents, social and personal as well as occupational; and costs to social relationships, covering marital strains and overpopulation. The individual values and disvalues in each cluster, listed in the Exhibit, represent all of those that have been commonly identified in studies of the value of children.

It is assumed that the supply and the family-limitation cost factors do not directly affect these values and disvalues, though they may have indirect effects in two ways: through affecting the demand factors and through affecting actual fertility, which could have feedback effects on values and disvalues. The demand factors, on the other hand, should directly affect values and disvalues attached to children and may in fact operate by modifying those values and disvalues.

Each of the demand factors is complex. None, for instance, is exclusively economic, or exclusively demographic, or exclusively psychological. However, as convenient shorthand, I will refer to mortality reduction as the demographic explanation, to rising aspirations as the psychological explanation, to vanishing economic roles for children as the economic explanation, to the emergence of the conjugal family as the social explanation, and to weakening cultural props for fertility as the cultural explanation. The predicted effects of each of these factors on values and disvalues are shown in Table 2 and will now be discussed. For later reference, each prediction has been assigned a letter to indicate the explanatory factor and a number to indicate the value or disvalue cluster affected.

Mortality reduction

The "demographic" explanation, mortality reduction, operates as a supply factor in a positive direction, increasing family sizes because more children survive, more women live to the end of their childbearing periods, and more men can reproduce over longer periods (Ridley and others, 1967). These effects are usually associated with improvements in fecundity, which is treated here as a separate factor. How mortality reduction affects demand is a complicated matter requiring careful distinctions.

EXHIBIT Advantages and disadvantages of having children, derived from content analysis of responses to open-ended questions

ADVANTAGES

- Instrumental assistance
  - Help in housework
  - Help in old age
  - Financial, practical help
  - Family name, line
  - Religious, social obligations
  - Adult status, social norms
- Rewarding interactions
  - Companionship, love
  - Happiness
  - Play, fun, distraction
  - Marital bond
- Psychological appreciation
  - Living through children
  - Achievement, power
  - Character, responsibility
  - Incentive to succeed
  - Fulfillment
- Other

DISADVANTAGES

- Financial costs
  - Cost of education
  - Other financial costs
- Childrearing demands
  - More work
  - Emotional strain
  - Health, pregnancy
  - Discipline
  - Child's sickness
  - Worry over child's future
  - Other childrearing problems
- Restrictions on parents
  - Tied down
  - Can't work
- Costs to social relationships
  - Marital strains
  - Overpopulation
- Other

At the societal level, it has sometimes been argued that mortality reduction will give rise, because of environmental and social factors, to an equilibrating fertility reduction (Davis, 1963). Societies are presumed to possess feedback mechanisms to maintain a stable equilibrium of births and deaths, around which temporary fluctuations may occur (Retherford, 1976:34). Whether this is so is an extremely complex issue that may be less a matter of empirical proof than general theoretical orientation. It seems more reasonable to adopt an opposing, social-Darwinian orientation that some societies at some points in their history have had such equilibrating mechanisms but others have not, and only those societies that have made adequate adjustments have survived as integral entities (see, for example, Coale, 1975). Then the fertility reduction will be seen to result not from mortality reduction directly but from the presence and operation of the equilibrating mechanisms, which in the present framework would be or would affect one or more of the other explanatory factors. There is a second reason for not accepting a direct mortality-fertility linkage as an effect of mortality reduction on demand for children: although fertility would be reduced in restoring equilibrium, the demand for children who survive to particular ages would be unchanged.

At the individual or family level, mortality reduction has been hypothesized to affect fertility through increasing the number of dependents (predominantly the young, though to some extent also the aged), through upsetting inheritance systems and generally overburdening social structures designed for lower survivorship, and through the reduced frequency with which couples have to "replace" lost children (e.g., R. Freedman, 1963:226–27). These effects, again, should not be considered changes in demand, because individual or couple targets for surviving children need not be affected. They are changes in demand for births, but not for children: the fertility reduction implied by these effects (with the minor exception of higher numbers of aged dependents) is such as to restore previous numbers of survivors.

Distinct from the replacement effect, and in fact affecting demand for children, is the insurance effect: instead of making up for child mortality, parents may have "extra" children ahead of time in anticipation of future mortality (Perlman, 1970; Wyon and Gordon, 1971; Abhayaratne and Jayewerdene, 1968). It is unlikely that parents would play the percentages exactly, having just enough children to compensate for probable losses, since mortality in the pretransitional period is not only high but also variable. It is much more likely that they would have more than necessary, and that more parents would have extra children than would lose them through mortality (O'Hara, 1972), so that desired family sizes would be smaller where there was no need to compensate in advance.

A second way in which mortality decline may affect demand is through changing the cost of children. Since it requires fewer births to provide some desired number of surviving children under lower mortality, the cost per survivor should decline (S. Cochrane and J. Cochrane, 1971). However, if one considers not only the costs of childbirth but also the costs of childrearing, it becomes evident that the cost per birth is higher under lower mortality. Whether costs will be perceived to increase or decrease, therefore, depends on whether couples decide on a particular family size or whether they make sequential decisions about each birth. Although the latter may be more likely (Namboodiri, 1972; Hass, 1974; Bulatao and Arnold, 1977), the ambiguity prevents any clear prediction about whether parents will perceive costs to rise.

There is a third way, suggested by El-Hamamsy (Heer, 1975:76), in which mortality reduction may affect the demand for children: under low mortality conditions, parents may invest more of their emotional energy in each child, and therefore have fewer emotional resources to raise added children. As with financial costs, however, a contradictory argument may be made: under high mortality conditions, parents may feel greater emotional tension in regard to each birth because of the chances of sickness and death. It is not clear, therefore, whether the demand effects of mortality reduction are positive or negative. Apart from the prediction that posttransitional parents should perceive less need for the security of having many children, the effects on values and disvalues attached to children cannot be predicted.

Rising aspirations

The "psychological" explanation, rising aspirations, was identified as an important factor as early as 1890, when Dumont pointed to the desire of the French middle classes to advance in social rank–to obtain more wealth and power, more beauty, more perfection, more knowledge–as the motive for their smaller families. Political democracy was supposed to have made such strivings realistic rather than purely wishful. Although Dumont's depiction of *capillarité sociale* has focused attention on strivings for social mobility, the aspirations noted are not restricted to the socially ambitious, but more generally involve concern with standard of living, or the entire "range of satisfactions considered appropriate for a civilized existence" (Banks, 1954:10). To the attainment of these satisfactions, children, or at least many children, matter little. One's aspirations often embrace one's family, but the means of their satisfaction is extrafamilial, unlike many of the positive sanctions available in traditional communities.

It is often suggested that the source of these aspirations is urban or urban-industrial living (e.g., Notestein, 1945:40), though in the modern era global communication networks may be equally responsible. More proximate and more specific sources of the individual's aspirations may be the members of the husband's occupational group (Heberle, 1941; D. Freedman, 1963); one's adolescent experience, as affected by the income level of one's parents (Easterlin, 1961, 1966); and one's own current income level (Becker and Lewis, 1973). Most aspirations are assumed to be internalized by the individual couple. They may, however, also be the aspirations of the state or the government, which it imposes on the couple through legislation, as in the case of compulsory education.

Between husbands and wives there is some asymmetry in rising aspirations. Husbands' aspirations may rise first because of their links with occupational and other networks outside the home, but wives' aspirations will eventually rise farther because they have a greater distance to go. Wives' aspirations also have greater impact on fertility because they are more likely to be inconsistent with raising large families. The desegregation of sex roles is essential to raising women's aspirations. Without this, women "cannot conceive of a glamor role or a career role which would compete with the childbearing role. They cannot complain that children prevent their getting outside the house, because outside activities are excluded anyway" (Davis, 1955:37). Creating economic and educational opportunities for women is one aspect of improving women's status; developing greater equality within the family is another, which may equally lead to higher aspirations.

An important distinction should be made between aspirations for oneself or one's spouse and aspirations for one's children. It is possible that these develop in sequence, aspirations for one's children and for one's immediate family generally rising earlier and being followed, in a later period when individualism has further undermined the family-centric perspective, by rising aspirations for oneself. A parallel distinction, in the microeconomic literature, is that between child quality and the time cost of chilren. The desire for higher child quality requires greater expenditures on children. The time cost factor operates differently: with rising aspirations for oneself, the time spent on children does not increase but begins to appear more valuable since it could more profitably be spent to attain new goals or to satisfy new needs.[4]

If children increasingly interfere with parents' new aspirations, we would expect the disvalues grouped under "restrictions on parents" to become more prominent. As argued earlier, this increase in prominence may be greater for wives than for husbands. Higher aspirations for children, on the other hand, cannot be achieved without additional expense. Children for whom parents have greater ambitions should cost more and require more of their parents' time, attention, and concern. These disvalues fall into two clusters, relating to financial costs and to childrearing demands. Aspirations may also have a positive side, insofar as children are concerned. Although most of the new aspirations are not satisfied through children, some of them may focus on children, particularly when alternatives are unavailable or proscribed. Achievement motives, for instance, or the desire for personal fulfillment, may be relatively new aspirations that might be partly satisfied in bearing or rearing children. These values are classified in the psychological appreciation cluster, and one may therefore predict some, perhaps less dramatic, increase in the prominence of this cluster or of particular values in it.

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[4] Microeconomists also speak of changing tastes in children, which might involve either child quality or preferences for commodities other than children. The concept of tastes is extremely vague and unspecific (one might add distasteful), almost like psychologists' use of the term "environment," and constitutes little more than those conditions one would lump under *ceteris paribus*.

Vanishing economic roles for children

The "economic" explanation, vanishing economic roles for children, has had several proponents. Coontz (1957) contended that variations in the demand for child labor explain the fertility transition. Among the wealthy, he said, child labor was of little consequence; slaves were available, and the wealthy could generally exert control over the productive activity of others. Among the poor, on the other hand, the decline in importance of child labor with the destruction of domestic industry in the West was temporarily compensated for by the labor demands of large-scale industrial production, until slower growth in these countries and the increased time and expense required to prepare an individual for productive labor made children a poorer investment. Legal restrictions on child labor might be added as another cause of the decline in the value of child labor, as might the development of pension and social security schemes that replace dependence on children.

In contemporary peasant societies, it has been contended–though Mueller (1976) disputes it–that children are of net economic benefit to their parents (Nag, Peet, and White, 1977; White, 1976). Expanding on this view, Caldwell (1977) has argued that there are only two types of fertility regime: pretransition, where children are of net benefit to their parents, and posttransition, where children are a net cost. The "great divide" between these two regimes is marked by the reversal in the direction of "intergenerational wealth flows." Before the transition, the net flow–counting not only money but also goods and services, as well as the benefits due to the extra political power exerted by a man with many children–is toward the parents; after the transition it is toward the children. The cause Caldwell identified for this reversal was a change in family structure.

Whatever causes the changes in the economic roles of children, the implication of these changes for perceived values is simply drawn: pretransitional parents should perceive there to be more economic benefits from children than posttransitional parents. These benefits are not limited to direct financial assistance, but may include assistance in old age and practical help on the farm or around the house that is not directly remunerated. The instrumental assistance cluster includes all of these values, though it includes others also.

Emergence of the conjugal family

The "social" explanation, the emergence of the conjugal family, requires careful delimitation. Some sociologists have seen change in family structure as the central factor, the root and cause of all other social changes tied to fertility. With modernization, the argument goes, the family loses its centrality in the culture, and its functions are increasingly taken over by distinct institutions. As a result, "the family or kinship group no longer dominates the social and economic reward system and can no longer exert pressure toward large family size goals" (Goldscheider, 1971:148). This argument covers more ground than I intend, since other factors, like aspirations or the economic role of children, could easily be subsumed under it.

To the extent that the factors being considered can be viewed as analytically distinct, the focus here is specifically on the shift from the family extended through mutual obligations to the nuclear, conjugal family, in which parents and children form a relatively self-contained, independent unit. Caldwell (1977) referred to this as the emotional nucleation of the family, which he saw as a peculiarly Western arrangement undergoing rapid diffusion in non-Western areas. The shift in emotional focus should be more important than any shift in residential patterns, which is subject to such external influences as the housing market. In considering the development of the Western family, Shorter (1975) similarly emphasized the importance of sentiment in the historical emergence of the nuclear family. This first sexual revolution (which involved, besides the stress on romantic love, the sentiments of maternal love and domesticity) resulted in

> a special sense of solidarity that separates the domestic unit from the surrounding community. Its members feel that they have much more in common with one another than they do with anyone else on the outside—that they enjoy a privileged emotional climate they must protect from outside intrusion, through privacy and isolation (Shorter, 1975:205).

Caldwell saw emotional nucleation as leading to fertility decline through reversing the intergenerational wealth flow. Since this hypothesis has already been covered under the previous factor, one might ask here whether there are other ways that the nuclear, conjugal family may promote lower fertility.

Two types of answers have been suggested. First, the costs of rearing children in a composite family or joint household do not impinge directly on the parents, but are distributed among all the members of the household. This is true both for economic costs and for the effort and inconveniences of child care. Thus, in the extended family, "there is no necessary implication that the husband must be 'able to support a wife and family' " (Davis, 1955:35). In the conjugal family, by contrast, the economies of scale in child production enjoyed by larger household units disappear, and costs can no longer be externalized and are shifted directly onto the parents (R. Freedman, 1963).

Second, the conjugal family involves an intensification of emotional attachments within the family. In the modern, impersonal setting, the conjugal family provides one of the few settings in which personal affective relations are maintained over long periods. In contrast, "popular marriage in former centuries was usually affectionless" (Shorter, 1975:55). Both husband-wife and parent-child relationships were intensified, as "the companionate aspect of marriage became emphasized over the reproductive aspect and the parent-child relationship shifted from one of exploitation in quantity to that of cultivation in quality" (United Nations, 1973:88). Aries considered this a major transformation, beginning around the seventeenth century, when the family "fell back upon the child, and its life became identified with the increasingly sentimental relationship between parents and children" (1962: 370). This aspect appears to parallel the rising aspirations factor, and in fact has one similar effect: parents make greater investments of money, time, and concern in their children. In the case of aspirations, however, the reason for this greater investment is the desire for a higher standard of living for one's children. In the present case, the reason is the emphasis on greater closeness to them and stronger emotional ties to them. The aspirations factor draws people out to compete, or to encourage their children to compete, in the wider world. The conjugal family factor draws them inward for emotional satisfactions.

As a result of the conjugal family's emergence and spread, parents should perceive the costs of children and the demands of childrearing (two separate disvalue clusters) to be heavier. As Shorter has succinctly put it: "Good mothering is an invention of modernization" (1975:55). The "reward" for this effort should be a greater sense of companionship with children and of the love they bring, or, in relation to our value classification, a greater prominence of the rewarding interactions cluster. Since the marital relationship also becomes more important, the effect of children on the marriage should become more salient.

Both negative effects, such as children generating more strain between husband and wife (which is in the last cluster, costs to social relationships), and positive effects, such as their cementing the marital bond (in the rewarding interactions cluster), should be more readily perceived.

Weakening cultural props

The last explanation is "cultural." Weakening cultural props for high fertility refer to the sanctions that the society, the community, and other large social groupings employ to encourage or discourage fertility. These sanctions may take the form of status or special honors awarded for large families, religious and ethical norms and standards, the imposition of traditional authority on the one hand and officially enunciated government policy on the other, as well as various social arrangements, such as inheritance laws, that encourage or discourage large families. The importance of the attitudes generated by religious and traditional sanctions is reflected in findings of apparent linguistic and religious barriers in the geographical spread of the fertility decline in Europe (Leasure, 1962; Knodel, 1974).

Sanctions attached to fertility have been considered props in the sense that, in traditional societies, they encourage the high fertility necessary to compensate for high mortality. They supplement or possibly override individual interests in children and replace these with social interests. Traditional societies are assumed to benefit from high fertility. Smaller social groups may equally benefit. The village is provided with more labor for food production and assured of continuity, the religious group is ensured of potential followers to indoctrinate, the corporate kin group is strengthened economically and militarily, and its life is projected into the future[5] (Lorimer, 1969). By contrast, social groups in modern societies may benefit less from high fertility. For instance, large numbers of children may make it difficult for families to acquire or accumulate land under conditions of growing pressure on resources (Demeny, 1968).

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[5] One could discuss these benefits to the corporate kin group as an aspect of the emergence of the conjugal family, but I have chosen to discuss them here, in part because it is convenient to summarize external social pressures on couples' fertility decisions under the factor of weakening cultural props. There is also some substantive justification. It is not clear that parents in the extended family should have any greater desire to strengthen and perpetuate the group than parents in the conjugal family. They are, however, under more immediate and constant pressure from others in the household, so that the difference is a matter of the force of social sanctions and is more properly classified here.

Couples may be aware of such benefits or harm to their membership groups from children and act directly on that awareness. Or each group may attempt to provide rewards to influence couples' decisions. One important type of reward is social status, either in the form of recognition as a full member of the community (after one has borne children) or in the form of a higher position in the social hierarchy (after many children).

Government sanctions, whether in support of pronatalist or antinatalist policies, are a special type. Many government programs affect the other explanatory factors discussed above. The policies themselves, however, may have some coercive force, particularly when community networks are mobilized to support them. The "cultural" explanation may still be valid, however, even if government policies have little effect, because the core of this explanation has to do with the force of traditional norms and their gradual deterioration, rather than with the strength of the official modernizing policies that have difficulty displacing them.[6]

If the weakening of cultural props for fertility does explain the transition, we would expect pretransitional parents to perceive greater lineage or kin, religious, and social benefits in having children. We would also expect them to emphasize more strongly the status rewards from childbearing. All of these values fall in the instrumental assistance cluster. The significance of cultural norms would be further supported if posttransitional parents saw social costs and rewards of children that are in consonance with some widely accepted government policy. This would generally mean that couples should perceive overpopulation as a problem that children aggravate. Since popular acceptance of such policies cannot be assumed, however, the failure of this prediction need not invalidate the cultural explanation.

Summary of predictions

Table 2 may be referred to again for a summary of the predicted effects on values and disvalues of each factor in the fertility transition. It is conceivable that others would see different linkages, but the ones I have identified appear to be the most obvious and direct connections. They also cover all of the demand-related factors, as well as all of the value and disvalue categories. It has been possible to link each demand-related factor to some set of values or disvalues of children. For each of the categories of values and disvalues, on the other hand, a factor affecting it has been identified. It appears that the extant explanations for the fertility transition are comprehensive: at one time or another some author has focused on one or another value or disvalue category as the possible explanation for the fertility transition. The ambiguous effects of mortality reduction on costs and childrearing demands are not included among the predictions. Two of the effects in Table 2 (the effect of rising aspirations on psychological appreciation values and the effect of the emergence of the conjugal family on rewarding interactions values) actually increase the value of children, but it is assumed that these effects are overwhelmed by other effects of the same factors in the reverse direction, leading to lower fertility. Except for the effects of these two factors on the financial costs of children and on childrearing demands, each predicted effect has a unique source in one of the five factors. It should be possible, therefore, to distinguish which explanatory factors are more and which are less consistent with data on the value of children. In the unlikely event that none of them is consistent with the data, the other factors in Table 1 not involving demand for children would have to be taken as better explanations for the fertility transition.

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[6] Should there be an additional cultural explanation having to do with traditional fatalism or irrationality in childbearing and the inability or inconceivability of planning one's family? Not necessarily, since this is already part of the contraceptive availability and efficiency factor, which covers not only contraceptive technology but also the basic idea that one can limit one's family. Traditional fatalism does not make consideration of demand factors irrelevant–various surveys show that even in relatively traditional settings most respondents can enunciate both advantages and disadvantages of children (Arnold and others, 1975)–though it may lead to more children than desired (which in turn may change desires because of the feedback effects of behavior on attitudes).

In the remainder of this paper, I examine data on values and disvalues attached to children to determine which predictions are borne out, and which factors, therefore, are likely to have operated in the fertility transition. Because good survey data on the value of children in past times is not available, cross-sectional comparisons will be made between countries presumably at different stages in the fertility transition. Some subnational comparisons will also be made among regions within countries and among individuals whose differential fertility indicates that they may be at different stages in the transition.

The predictions to be tested do not involve any assumptions about the causal force of values and disvalues. The most obvious among possible causal sequences is:

Explanatory factor → *Reduced values or increased disvalues* → *Lower fertility*

However, if value change is a consequence rather than a cause of lower fertility, or a cause rather than a consequence of a particular explanatory factor, the predictions will still stand. All that the predictions say is that, for an explanatory factor to account for lower fertility, it must be associated with particular value changes, whether as a consequence of these changes, a direct cause of them, or an indirect cause of them.

In interpreting values and disvalues of children as reflections of the fertility transition, I am not looking for any single, overall measure of value, nor for any concept of total utility as applied to children. Although such concepts have been successfully applied in the past (e.g., Townes and others, 1976), they involve sophisticated psychological measurement inappropriate for large-scale surveys, are based on subjective value hierarchies that vary from person to person, and, as summary measures, probably tell one less about how values change than investigation of individual values does. I am interested not in whether the total net value of a child changes in the fertility transition—I assume it does—but in whether and in what way specific values and disvalues change. It is not the fact of a value-of-children transition but its specific nature that I seek to elucidate.

METHOD

On the basis of these predictions, the demand-related explanations for the fertility transition will be evaluated against synchronic survey data on the value of children from seven Asian countries and two Western countries. The countries are Indonesia, the Republic of Korea, the Philippines, Singapore, Taiwan, Thailand, Turkey, the United States, and West Germany. In each country, except West Germany, between 1,000 and 3,000 currently married women were interviewed in 1975 or 1976, as were a quarter to a half of all their husbands. The West German sample was smaller, consisting of about 300 married women with one child. Two samples, the West German and the Indonesian, were not nationally representative. The West German sample was drawn from the state of Bavaria, and in Indonesia the sample was limited to two ethnic groups, Javanese in Central Java and Sundanese in West Java. The remaining samples were designed to be nationally representative and did in fact cover many remote, traditional villages. Some samples excluded areas of insurgency, however. Table 3 summarizes the characteristics of each sample.

Comparisons of values and disvalues will be made across countries with different fertility levels. Longitudinal comparisons within countries would be preferable, but such data are not available. Using cross-sectional comparisons to test longitudinal propositions requires the assumption that all of the countries are involved in the same basic fertility transition process, though the stages they have reached and the speed of their progress differ. The samples include three distinct groups of countries: (1) high-fertility countries, with crude birth rates (as of 1976) between 35 and 45 per thousand and gross reproduction rates (as of 1973) between 2.500 and 3.250; (2) moderate-fertility countries, with crude birth rates of 20 to 30 and GRRs of 1.250 to 2.000; and (3) low-fertility countries, with crude birth rates of 10 to 15 and GRRs of 0.750 to 1.000. In these comparisons, culture, history, ethnicity, and other factors that may have no intrinsic relation to stage in the fertility transition may obscure the differences among these groups or produce spurious ones. Turkey aside, all the high-fertility countries are Southeast Asian; those with moderate fertility are two East Asian countries (Korea and Taiwan) and Singapore, which has a Chinese majority; and the low-fertility countries are both Western. With the limited number of countries to be compared, it is not feasible to introduce other country-level variables as controls. To provide further tests of the hypotheses, therefore, additional comparisons will be made within countries.

First, the sampled cities and counties in Korea and regions in the Philippines will be contrasted. These two countries were chosen for reasons of convenience. It was possible to group respondents by sample area, and fertility estimates by area (total fertility rates calculated by the own-children method) were available from other sources.

Second, in each of the nine countries except West Germany two groups of respondents will be contrasted. Those with two or fewer living children who were limiting their families (i.e., who expressed the desire to have no additional children and who were besides using contraception) will be referred to as "low-parity limiters," and may be considered the prototypic posttransitional group. Those with five or more living children who did not indicate that they wanted fewer children and who were not limiting their families (i.e., they wanted more children or they were not using contraception, or both) will be referred to as "high-parity nonlimiters" and may be considered the prototypic pretransitional group. These definitions proved rather stringent: each group comprised a small proportion of each country sample, ranging from 1 to 23 percent (see Table 7). The size of the groups varied, as expected, with fertility level, except for Turkey, which had relatively fewer nonlimiters and more limiters than expected. Excluding other groups at intermediate parities and of less definite fertility

TABLE 2 Predicted effects of demand-related explanatory factors on values and disvalues attached to children

	Explanatory factor				
Value or disvalue cluster	Mortality reduction (Demographic)	Rising aspirations (Psychological)	Vanishing economic roles for children (Economic)	Emergence of the conjugal family (Social)	Weakening cultural props (Cultural)
Value cluster					
1 Instrumental assistance	D1 Insurance against mortality should become less prominent		E1 Economic benefits should decrease		C1 Status, social benefits should become less prominent
2 Rewarding interactions				S2 Marital bond, companionship should become more prominent	
3 Psychological appreciation		P3 Should become more prominent			
Disvalue cluster					
4 Financial costs		P4 Should rise		S4 Should rise	
5 Childrearing demands		P5 Should become heavier		S5 Should become heavier	
6 Restrictions on parents		P6 Should become more prominent			
7 Costs to social relationships				S7 Marital strain should become more prominent	C7 Concern about overpopulation should become more prominent

NOTE: Each predicted effect is identified by a capital letter and a number. The letter represents the explanatory factor (as characterized in parentheses in the table heading); the number represents the value or disvalue cluster affected.

intentions should make it possible to observe value and disvalue differences in more "purified" form.

Of the three types of comparison, the comparisons across countries are the most important ones, since transition theory applies primarily to total societies.[7] Comparisons across individuals are often used in studies of the determinants of fertility, where many variables can be measured on samples of substantial size. Presumably a factor that reduces fertility levels in a society does not affect every potential childbearer equally and simultaneously but must, after it has begun to operate, produce fertility differentials at the individual level. If the factor operates only in the fertility transition (rather than being a relatively permanent cause of differentials), however, its influence will not be observed before it operates nor after its effect has been completely diffused. Individual comparisons, therefore, may reinforce cross-national comparisons, but the lack of individual contrasts at a particular stage in the transition does not negate the operation of a particular factor. The comparisons across communities would be essentially parallel to cross-national comparisons if the communities being compared were homogenous cultural entities with sharp boundaries, or essentially parallel to individual comparisons (except for the ecological effect) if the communities were essentially random groupings. Neither of these is the case for the Philippine and Korean sample areas being compared, so that these comparisons are intermediate between the other two types.

Some of the contrasts between countries and between sample areas will be described below as if they involved changes over time. What is meant, in each case, is that, from these cross-sectional contrasts, longitudinal changes are being inferred, in accordance with the previously stated assumption of a single basic fertility transition process that all countries have been, are, or will be implicated in.

The measures to be compared come from a uniform set of questions used in each of the surveys[8] about values and disvalues attached to children. Respondents answered open-ended questions on the advantages and disadvantages of having children, as opposed to not having children. Up to four answers were coded for each respondent by means of detailed coding schemes (Angeles, 1978), which were then collapsed into the more general categories shown in the Exhibit. The problems of applying coding schemes across cultures are considerable (see, e.g., Whiting, 1968), and complete agreement on detailed categories is difficult to achieve. Nevertheless, the use of more general categories in this paper considerably increases the reliability of results.

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[7] As Ronald Freedman (1975:10) has written: "The problem is not why one couple rather than another is at a particular place in the frequency distribution of births in a society, but why the society as a whole has the particular fertility distribution that distinguishes it from another."

[8] Some questions were omitted in the German study.

Respondents also answered a variety of structured questions. They rated 19 values as very important, somewhat important, or not important reasons for having children. In addition they chose the most important and the second most important from among nine general life values and indicated whether these values were satisfied by having children. Separate questions determined whether they expected various types of economic or practical help from their sons or daughters. On still other questions respondents rated the importance of different costs of children. No questions are covered that deal with values and disvalues related to the desire for specific numbers of children. These will be treated elsewhere. Although it is change in values and disvalues specifically tied to number that should affect fertility, general values and disvalues should also show particular trends if the explanatory factors that have been discussed are in fact operative.

For most of the measures, percentages of respondents giving particular answers will be reported. For the ratings of reasons for having children, however, percentages appeared, on examination, to be inappropriate. In a set of attitude items of this sort, a halo effect often operates: respondents who wanted more children tended to rate all the reasons higher and respondents who wanted fewer children tended to rate all the reasons lower. To control for this effect and provide more meaningful comparisons consistent with the other measures, the mean rating across the 19 items was determined for each respondent, and deviations from this mean are reported instead.

As will be seen below, using ratings adjusted in this fashion produced results comparable to those from the open-ended advantages and disadvantages questions. Raw ratings, on the other hand, generally did not show interpretable patterns. The use of adjusted ratings may be justified, from a theoretical perspective, by the focus in this paper on changes in the emphases given to different values rather than on changes in the global net value of children. As relative rather than absolute measures, the adjusted ratings are consistent with this focus.

The open-ended questions about advantages and disadvantages of children also provide relative rather than absolute measures. They force comparisons between values, because some responses, but not more than a few, are usually expected by the interviewer and can ordinarily be recorded to each question. The number of responses an individual gives varies within a narrow range, because the survey method demands some answer but does not facilitate unlimited probing. The values mentioned are presumably those most salient to the respondent, but degree of salience cannot be equated across respondents. It may be more generally true that, in making wide-ranging cross-cultural comparisons across groups who do attach some positive utility to having children, it is easier and more meaningful to compare the most prominent values that different individuals attach to children than to attempt to quantify a net value for each individual.

FINDINGS

The different value and disvalue measures will be discussed not by type of question but in the order of the hypotheses about the fertility transition to which they relate. I will consider in order values relevant to the hypothesis of vanishing economic roles for children, values relating to the hypothesis of rising aspirations, values involved in the hypothesis of the emergence of the conjugal family, values relevant to the cultural props hypothesis, and finally values reflecting on the mortality reduction hypothesis.

Vanishing economic roles for children

Prediction E1, that economic benefits from children should decrease, was clearly supported by the data on advantages of children (Table 4). Three values–help in housework, help in old age, and financial and practical help–declined in salience across countries as fertility fell. Data for wives and for husbands showed parallel declines. Help in housework was sharply lower in Turkey and Thailand than in the Philippines and Indonesia, and it slipped slightly lower still in the moderate- and low-fertility countries. By contrast, help in old age declined slightly in salience between high-fertility and moderate-fertility countries, but declined much more sharply between moderate-fertility and low-fertility countries. The salience of financial and practical help declined more uniformly from high- to moderate- to low-fertility countries, the case of Turkey being the exception.

Among the rated reasons for having children, two involved economic contributions: to work and help and to depend on when old. Both declined in importance across countries. To work and help received positive ratings in the high-fertility countries, negative ratings (i.e., ratings below the mean for all values) in moderate-fertility countries, and even more negative ratings in low-fertility countries. To depend on when old received positive ratings in high and moderate-fertility countries, and strongly negative ratings in low-fertility countries.

Expectations of help from sons and daughters also showed declines. An average of about 80 percent of respondents expected each type of help in the high-fertility countries. This dropped to about 75 percent in Korea and Taiwan and only 40 percent in Singapore. In the United States, the average was also about 40 percent. (These questions were not asked in West Germany.) For specific expectations, the usual pattern was for proportions expecting that type of help from children to be sharply lower in the two lowest-fertility countries, Singapore and the United States. This was true for expecting children to contribute part of their salary to the household and for expecting them to support younger siblings through school. It was also true for expecting sons to provide support in old age, but expecting daughters to provide support in old age was lower not only in these two countries but also in the other moderate-fertility countries. For expecting help from children in emergencies, the pattern also held, except that the proportions were higher in the United States than in Singapore. For expecting help in housework, the pattern was different: some decline for moderate-fertility countries, but a subsequent rise in the United States.[9]

Similar declines appeared across Philippine regions (Table 5) and Korean cities and counties (Table 6). Overall, the economic benefits expected from children were less salient among the advantages of children in Korea than in the Philippines, and in both countries they were less salient in areas of lower fertility. Help in housework was mentioned by 49 percent of wives in Bicol (which had the highest fertility among the Philippine regions contrasted), but by only 12 percent in Manila, by 11 percent in Hongchon county (with the highest fertility among the Korean sample areas), but by 0 percent in Seoul. The declines were not smooth from the highest to the lowest fertility level, however. Help in housework was about equally salient for most Philippine regions, dropping sharply only for the two most developed regions. In Korea this value dropped sharply after Hongchon, and then stayed constant at a low level. This finding agrees with the cross-national pattern of declines in the salience of household help mainly between high and moderate fertility levels. For husbands, the declines

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[9] One might also note, in this table, the differences in expectations of help from sons and from daughters, especially in Korea, Taiwan, and Turkey. Moreover, there were systematic differences between wives and husbands: on the average across countries, the wives expecting help were over 5 percentage points more than the husbands expecting help.

TABLE 3 Characteristics of samples

	Number in sample				Type of sample[b]			
Country	Wives	Husbands	Sample coverage	Age criterion for wives[a]	PPS or not	No. of stages	Major strata	Interviewing period
Indonesia (Javanese)	1,032	487	Javanese in Central Java only	Up to 39	No[c]	4	Urban, rural	Mar.–Apr. 1975
Indonesia (Sundanese)	1,002	496	Sundanese in West Java only	Up to 39	No[c]	4	Urban, rural	Mar.–Apr. 1975
Korea	1,565	490	National, excluding Cheju island and remote islands	Up to 39	No[d]	3	Seoul-Pusan, urban, rural	Jan. 1976
Philippines	1,691	382	National, excluding Western Mindanao and small islands	Up to 39	Yes	3	City of Manila, urban, rural	Sept.–Dec. 1975
Singapore	977	491	National	15–40	Yes	2	Urban govt. housing, other urban, suburban govt. housing, other suburban, rural	Oct. 1976–Mar. 1977
Taiwan	2,217	1,023	National, excluding aboriginal areas and remote islands	Up to 44	Yes	3	27 clusters of townships grouped by urbanization, education, and fertility	Jan.–Apr. 1976

Thailand	2,614	1,311	National, excluding four Muslim provinces and Northeast border areas	15–39	No[e]	4	Four regions, Bangkok	Apr.–May 1976
Turkey	1,760	545	National	Up to 39	No[d]	4	18 strata defined by urbanization and level of development	Aug.–Sept. 1975
United States	1,569	456	Coterminous U.S. excluding military reservations	15–39	Yes	4	74 groups of SMSAs and counties homogenous in pop., pop. in major city, etc.	Jan.–Apr. 1975
West Germany	296	0	Bavaria	Up to 32[f]	Yes	2	Cities, towns, villages	Sept.–Nov. 1976

PPS–probability proportional to size.

SMSA–standard metropolitan statistical area.

[a] For all samples, the female respondent had to be a currently married woman who met the age criterion and whose husband was living with her. (If the husband was temporarily absent, the total expected duration of absence was not to exceed six months.) The samples of husbands were chosen from among those whose wives were interviewed.

[b] All samples were stratified, multi-stage samples utilizing systematic random selection or simple random selection.

[c] Fixed numbers of units were selected at each stage.

[d] Each stratum had a different sampling fraction. Fractional weights were applied to keep the total number of respondents constant.

[e] Urban areas were overrepresented by a factor of two. Fractional weights were applied to keep the total number of respondents constant.

[f] Only women with one child were interviewed.

TABLE 4 Indicators of children's economic roles, by country and sex of respondents: 1975–76

Indicator	Country (crude birth rate, 1976[a])								
	Philippines (41)	Turkey (39)	Indonesia (38)	Thailand (36)	Korea (29)	Taiwan (23)	Singapore (20)	United States (13)	West Germany (10)
WIVES									
Percentage mentioning advantages									
Help in housework	35	11	33	9	3	4	9	3	0
Help in old age	44	43	60	27	23	30	41	7	10
Financial, practical help	49	22	53	54	26	17	13	2	1
Ratings[b] of reasons for having children									
To work and help	.11	.06	.06	.04	−.31	−.25	−.18	−.50	−.37
To depend on when old	.20	.24	.13	.31	.08	.14	.30	−.48	−.41
Percentage expecting help from sons									
Help around house	83	65	81	73	82	68	39	85	na
Support in old age	86	93	82	89	85	85	39	12	na
Part of salary	67	77	60	71	71	76	38	29	na
Contribution in emergencies	88	95	83	92	87	92	58	74	na
Support for siblings' schooling	84	87	81	86	65	83	44	13	na
Percentage expecting help from daughters									
Help around house	94	94	92	96	84	82	55	92	na
Support in old age	85	81	77	87	46	39	31	11	na
Part of salary	68	60	56	68	59	72	32	29	na
Contribution in emergencies	88	85	81	89	75	88	49	73	na
Support for siblings' schooling	84	76	72	83	59	79	39	13	na
(Number of respondents[c])	(1,691)	(1,760)	(2,034)	(2,614)	(1,565)	(2,217)	(977)	(1,569)	(296)
HUSBANDS									
Percentage mentioning advantages									
Help in housework	31	8	16	7	2	3	4	2	na
Help in old age	39	44	48	28	20	30	36	8	na
Financial, practical help	53	23	56	51	22	22	11	4	na

TABLE 4 *(continued)*

	Country (crude birth rate, 1976[a])								
Indicator	Philippines (41)	Turkey (39)	Indonesia (38)	Thailand (36)	Korea (29)	Taiwan (23)	Singapore (20)	United States (13)	West Germany (10)
HUSBANDS *(continued)*									
Ratings[b] of reasons for having children									
To work and help	.10	−.04	.05	.06	−.27	−.30	−.31	−.46	na
To depend on when old	.17	.24	.11	.28	−.13	.07	.25	−.51	na
Percentage expecting help from sons									
Help around house	86	80	89	73	82	67	33	87	na
Support in old age	82	88	82	78	79	76	31	12	na
Part of salary	61	67	52	53	63	62	29	19	na
Contribution in emergencies	85	88	81	87	81	86	49	66	na
Support for siblings' schooling	83	87	81	82	60	79	35	16	na
Percentage expecting help from daughters									
Help around house	92	91	93	92	80	79	48	90	na
Support in old age	80	67	81	75	43	29	25	11	na
Part of salary	61	27	50	49	42	57	24	18	na
Contribution in emergencies	84	62	80	84	66	80	43	65	na
Support for siblings' schooling	80	67	80	77	52	74	31	15	na
(Number of respondents[c])	(382)	(545)	(983)	(1,311)	(490)	(1,023)	(491)	(456)	(0)

na—not applicable to West German sample.

a Source of crude birth rates: Population Reference Bureau (1976).

b Deviations from the mean rating assigned by each individual to all 19 reasons. Original ratings were on a scale from 1 (not important) to 3 (very important).

c Because of missing data, some percentages and means are based on slightly fewer respondents.

TABLE 7 Indicators of children's economic roles among high-parity
1975–76

Indicator	Philippines HPN	Philippines LPL	Turkey HPN	Turkey LPL	Indonesia HPN	Indonesia LPL
WIVES						
Percentage mentioning advantages						
Help in housework	48	21	5	5	40	41
Help in old age	40	45	54	41	60	38
Financial, practical help	63	40	31	11	56	71
Ratings of reasons for having children						
To work and help	.14	.06	.38	−.36	.09	.07
To depend on when old	.17	.13	.29	.21	.14	.13
Percentage expecting help from sons						
Help around house	89	78	80	45	83	73
Support in old age	93	86	100	74	78	79
Part of salary	82	55	85	45	58	74
Contribution in emergencies	92	80	98	89	82	82
Support for siblings' schooling	93	77	100	68	82	88
Percentage expecting help from daughters						
Help around house	95	95	97	91	90	94
Support in old age	92	87	92	63	73	79
Part of salary	82	60	75	40	57	71
Contribution in emergencies	92	81	92	80	82	82
Support for siblings' schooling	92	83	97	63	79	76
(Number of respondents)	(182)	(92)	(59)	(141)	(260)	(34)
(Respondents as percentage of sample)	(11)	(5)	(3)	(8)	(13)	(2)
HUSBANDS						
Percentage mentioning advantages						
Help in housework	41	7	4	1	18	28
Help in old age	46	50	47	25	45	67
Financial, practical help	66	43	19	16	59	39
Ratings of reasons for having children						
To work and help	.12	.12	.23	−.27	.10	.06
To depend on when old	.12	.18	.44	.18	.14	.12

nonlimiters and low-parity limiters, by country and sex of respondents:

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
14	5	13	0	5	1	18	8	6	2
19	26	49	10	31	19	41	27	11	6
70	41	8	33	24	14	23	4	6	3
.19	−.02	−.14	−.41	.02	−.58	.22	−.41	−.49	−.48
.28	.33	.54	−.23	.19	−.03	.51	.14	−.52	−.49
88	66	90	81	75	52	52	27	83	83
97	86	100	81	97	67	43	26	23	10
87	62	85	69	97	65	57	22	53	28
98	89	90	89	97	90	68	41	78	75
97	76	74	60	97	71	57	27	22	11
99	95	84	85	87	65	66	39	100	90
93	84	37	46	47	43	23	20	23	10
83	60	49	47	93	61	39	20	56	28
95	88	64	77	93	86	50	34	78	73
94	75	67	49	92	66	41	25	17	11
(160)	(179)	(40)	(141)	(60)	(160)	(44)	(140)	(18)	(327)
(6)	(7)	(3)	(9)	(3)	(7)	(5)	(14)	(1)	(21)
8	9	10	3	5	0	6	3	0	2
24	28	47	18	40	14	53	27	25	4
63	39	16	25	5	26	23	10	0	4
.13	.01	−.28	−.50	−.12	−.42	−.09	−.54	−.69	−.46
.25	.27	.03	−.37	.28	−.18	.19	.16	−.69	−.41

TABLE 7 *(continued)*

	Philippines		Turkey		Indonesia	
Indicator	HPN	LPL	HPN	LPL	HPN	LPL
HUSBANDS *(continued)*						
Percentage expecting help from sons						
Help around house	88	87	98	76	89	78
Support in old age	95	73	100	82	84	89
Part of salary	76	47	62	40	55	72
Contribution in emergencies	88	67	100	83	86	89
Support for siblings' schooling	90	53	100	71	82	88
Percentage expecting help from daughters						
Help around house	95	87	100	95	93	89
Support in old age	93	80	71	65	83	89
Part of salary	75	47	21	21	53	78
Contribution in emergencies	85	73	48	58	85	89
Support for siblings' schooling	87	53	23	51	80	88
(Number of respondents)	(41)	(15)	(20)	(36)	(134)	(18)
(Respondents as percentage of sample)	(11)	(4)	(4)	(7)	(14)	(2)

HPN—high-parity nonlimiters.
LPL—low-parity limiters.

were parallel. Help in old age showed a tendency to rise instead of falling at the lowest fertility levels in the Philippines, but a more predictable decline was seen across Korean sample areas: the proportion of wives mentioning this value ranged from 45 to 27 percent in the six higher-fertility areas, and from 17 to 10 percent in the four lower-fertility areas. (Korean husbands showed a corresponding pattern.) These patterns are, again, consistent with the cross-national pattern of declines in the salience of old-age help between moderate and low fertility levels. Salience of the third related value, financial and practical help, was more consistent with predictions for the Philippines, where it declined for Manila, than for Korea, where little pattern could be discerned.

On the structured questions, the patterns were also supportive of the predictions. In the Philippine sample, the two economic reasons for having children did not vary consistently across most of the re-

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
85	75	83	76	80	57	28	27	83	83
92	66	94	69	95	57	44	18	23	10
79	39	89	55	90	37	17	22	53	28
98	79	94	79	100	75	67	30	78	75
93	79	100	49	100	64	44	21	22	11
99	91	94	81	70	70	67	35	100	90
92	65	63	38	30	26	28	15	23	10
75	34	77	35	85	31	6	21	56	28
97	75	73	61	85	69	61	29	78	73
91	71	89	47	90	55	44	21	17	11
(92)	(101)	(12)	(47)	(20)	(84)	(18)	(68)	(8)	(103)
(7)	(8)	(2)	(10)	(2)	(8)	(4)	(14)	(2)	(23)

gions, but dropped in importance for the metropolitan Manila area. In the Korean sample, these two reasons received lower importance ratings in the four lowest-fertility sample areas. The line, in both countries, appeared to be drawn between larger urban areas, where these economic reasons were discounted, and all other areas, where these economic reasons still held sway.

In regard to expectations of help from children, Manila residents generally had the fewest expectations, though expectations were also relatively low in Eastern Mindanao. Expectations in Korea were at roughly the same level as in the Philippines for sons, but at a lower level for daughters. Among the Korean cities and counties, expectations were lowest in Daegu, with the second lowest fertility level, and slightly higher in Seoul, with the lowest fertility level.

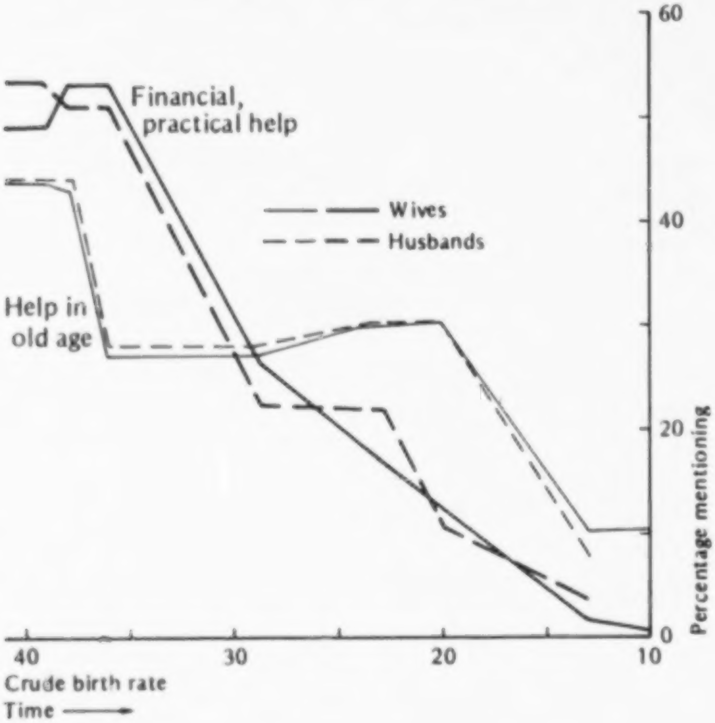
Across individuals, Prediction E1 also stood up fairly well (Table 7). Percentage differences on the open-ended question between high-parity nonlimiters and low-parity limiters were interpreted only if they reached or exceeded 10 percentage points. Most of the differences—and some of them were quite large, exceeding 30 percentage points—were in the expected direction, high-parity nonlimiters mentioning more economic benefits than low-parity limiters. The differences were most consistent for financial and practical help (the low-fertility United States being one of the exceptions), than for help in old age (where differences were striking in the moderate-fertility countries and Turkey), and least for help in housework (where only the Philippines showed differences for both wives and husbands).

On the structured measures, a striking difference was observed in the moderate-fertility countries: limiters rated the two economic reasons for having children considerably less important than did nonlimiters. This was partly true also in Turkey and Thailand. In regard to expectations of help, confirmatory differences exceeding 10 percentage points (limiters expecting less help than nonlimiters) appeared in the majority of comparisons in each country, Indonesia being the only exception. The specific types of help expected that distinguished limiters and nonlimiters varied by country, by sex of child, and by sex of respondent. Distinctions were slightly more common, overall, on expecting children to contribute part of their salary to the household, on expecting them to support siblings through school, and on expecting support in old age, and slightly less common on expecting contributions in emergencies and expecting help around the house.

Overall, therefore, Prediction E1 had excellent support, and the idea that vanishing economic roles for children is a factor in the fertility transition was consistent with the data. This positive result can be readily portrayed in a way that glosses over some of the inconsistencies in the data. Figure 1 charts the salience, on the advantages question, of two of the values, help in old age and financial and practical help, across countries as fertility falls. What have been plotted are not the actual percentages but smoothed figures, obtained by repeatedly taking medians of every three successive values, with a special technique applied to end points (Tukey, 1977:210–23). The decline in the salience of economic benefits thus appears sharply delineated.

The data also suggested that particular economic benefits decline in a specific pattern. Help in housework appears to decline earliest and, when moderate fertility levels are reached, has little further room to decline. Help in old age does not decline substantially until the transition from moderate to low fertility levels begins. Financial and practical help, finally, declines continuously. The ability of each value to

FIGURE 1 Salience of help in old age and financial, practical help by fertility level, after smoothing



NOTE: Smoothing involved repeatedly taking medians of three successive values (Tukey, 1977:210–23).

distinguish individuals with a high-fertility pattern from individuals with a low-fertility pattern can be deduced from the timing of these declines. Financial and practical help differentiated these groups in high-fertility and moderate-fertility countries, help in old age was differentiating in moderate-fertility countries, and help in housework had some capacity to differentiate mainly in high-fertility countries. These patterns were more evident with the general questions than with questions about specific types of help expected.

Rising aspirations

Rising aspirations among parents should be reflected in four types of value changes: increased concern with the restrictions children impose on their parents, as the parents' extrafamilial involvements broaden; more awareness of the psychological benefits of having children, such

TABLE 5 Indicators of children's economic roles, by region and sex of respondents: Philippines, 1975–76

Indicator	Region (total fertility rate, 1968[a])									
	Bicol (7,015)	Mindanao (6,543)	East Visayas (6,348)	Central Luzon (6,126)	Cagayan (6,058)	West Visayas (5,929)	Central Visayas (5,338)	Ilocos (5,243)	Southern Tagalog (5,175)	City of Manila (3,349)
WIVES										
Percentage mentioning advantages										
Help in housework	49	45	49	31	46	33	56	43	21	12
Help in old age	51	17	41	41	23	45	34	44	55	67
Financial, practical help	51	43	59	56	62	54	52	60	42	33
Ratings for reasons for having children										
To work and help	.11	.18	.21	.07	.17	.08	.16	.25	.09	−.07
To depend on when old	.21	.23	.30	.18	.22	.21	.27	.37	.15	.14
Percentage expecting help from sons										
Help around house	85	82	88	81	85	95	89	84	77	67
Support in old age	86	75	99	83	92	93	94	90	83	63
Part of salary	71	58	74	72	77	72	82	73	57	43
Contribution in emergencies	91	72	84	91	93	85	93	97	89	82
Support for siblings' schooling	85	70	84	90	86	90	88	92	80	78
Percentage expecting help from daughters										
Help around house	93	90	100	95	95	93	98	96	93	88
Support in old age	82	72	99	83	88	93	93	91	82	71
Part of salary	67	56	68	73	80	77	83	81	60	47
Contribution in emergencies	90	69	88	93	92	87	92	99	88	86

Support for siblings' schooling	82	72	99	83	88	93	93	91	82	71
(Number of respondents)	(130)	(125)	(69)	(201)	(84)	(239)	(172)	(77)	(545)	(49)
HUSBANDS										
Percentage mentioning advantages										
Help in housework	47	31	39	24	55	35	61	50	13	8
Help in old age	59	21	39	29	32	35	28	8	53	42
Financial, practical help	41	52	54	45	45	65	53	75	53	17
Ratings for reasons for having children										
To work and help	−.01	.13	.29	.00	.22	.05	.17	.27	.12	−.08
To depend on when old	.20	.06	.29	.05	.26	.21	.36	.27	.14	−.25
Percentage expecting help from sons										
Help around house	91	69	100	87	100	99	86	100	77	67
Support in old age	82	69	100	76	73	94	92	83	79	42
Part of salary	71	52	77	50	59	78	69	83	52	17
Contribution in emergencies	79	62	100	87	95	91	86	92	85	67
Support for siblings' schooling	85	59	100	92	86	93	81	92	80	67
Percentage expecting help from daughters										
Help around house	100	79	100	92	95	96	86	100	92	75
Support in old age	82	65	100	68	73	94	83	83	79	50
Part of salary	68	45	85	50	68	75	69	83	53	17
Contribution in emergencies	82	59	100	84	91	88	83	100	85	67
Support for siblings' schooling	82	65	100	68	73	94	83	83	79	50
(Number of respondents)	(34)	(29)	(13)	(38)	(22)	(69)	(36)	(12)	(117)	(12)

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a Calculated by Robert Retherford and others using the own-children method and data from the 1973 National Demographic Survey (personal communication).

TABLE 6 Indicators of children's economic roles, by sample area and sex of respondents: Korea, 1976

Indicator	City or county (total fertility rate, 1974[a]) Hongchon (4,873)	Sosan (4,417)	Naju (4,080)	Jonju (3,728)	Jinju (3,707)	Changnyong (3,637)	Seongnam (3,518)	Pusan (2,846)	Daegu (2,578)	Seoul (2,347)
WIVES										
Percentage mentioning advantages										
Help in housework	11	2	1	5	1	4	1	1	2	0
Help in old age	30	27	45	34	28	29	17	12	15	10
Financial, practical help	15	28	21	41	29	19	44	20	17	27
Ratings for reasons for having children										
To work and help	−.12	−.36	−.04	−.28	−.20	−.08	−.45	−.47	−.38	−.41
To depend on when old	.37	.12	.31	.19	.22	.33	−.04	−.18	−.04	−.10
Percentage expecting help from sons										
Help around house	81	80	81	82	82	86	84	86	77	83
Support in old age	82	87	93	86	87	89	88	84	74	83
Part of salary	68	67	88	63	68	74	75	75	62	70
Contribution in emergencies	79	89	91	89	84	89	90	96	78	86
Support for siblings' schooling	63	65	84	65	62	74	69	60	52	58
Percentage expecting help from daughters										
Help around house	84	84	83	82	91	79	91	87	73	86
Support in old age	38	51	52	36	44	42	55	54	38	45
Part of salary	50	60	68	47	63	57	61	62	47	65
Contribution in emergencies	56	79	84	72	82	65	83	81	73	77
Support for siblings' schooling	59	64	62	50	62	59	58	55	45	57
(Number of respondents[b])	(95)	(269)	(77)	(125)	(143)	(143)	(146)	(103)	(146)	(318)

HUSBANDS										
Percentage mentioning advantages										
Help in housework	7	3	3	0	0	3	2	0	3	1
Help in old age	37	18	29	33	21	27	19	14	18	9
Financial, practical help	26	23	18	27	28	19	27	27	13	22
Ratings for reasons for having children										
To work and help	−.23	−.25	−.22	−.16	−.19	.04	−.46	−.31	−.17	−.40
To depend on when old	.15	−.04	.37	−.01	.08	.24	−.17	−.42	−.27	−.54
Percentage expecting help from sons										
Help around house	86	82	65	87	79	93	85	86	64	85
Support in old age	86	80	91	69	86	90	67	73	64	77
Part of salary	70	64	73	57	55	73	58	64	56	60
Contribution in emergencies	86	85	79	74	79	83	79	86	67	79
Support for siblings' schooling	76	66	71	50	52	73	60	59	44	49
Percentage expecting help from daughters										
Help around house	93	84	79	70	79	71	87	82	64	79
Support in old age	48	51	41	33	31	39	33	50	41	41
Part of salary	41	51	38	30	41	46	23	55	33	43
Contribution in emergencies	69	71	59	73	69	68	63	82	46	63
Support for siblings' schooling	55	63	62	43	45	54	46	50	31	48
(Number of respondents[b])	(29)	(89)	(34)	(40)	(29)	(41)	(48)	(22)	(39)	(119)

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[a] Calculated by Robert Retherford and others using the own-children method and 1975 census data (personal communication).

[b] Unweighted. Since the weights for all respondents of a given sex in each city or county are identical, percentages and means are not affected by weighting.

as the opportunities for self-fulfillment and for satisfying new aspirations to achievement and power through children; greater importance being attached to the financial costs, as parents' aspirations for the children themselves rise; and greater importance being attached to the demands of childrearing, as parents attempt to do more for their children. Data relevant to each type of value change will be considered.

Restrictions on parents. Prediction P6 says that, because of rising aspirations, restrictions on parents should be more salient at lower fertility levels. Two disvalues among the disadvantages of children are relevant, one having to do with work restrictions and the other a catchall for social, personal, and other restrictions: that children tie one down. Work restrictions were less salient, in every case, than the broad idea of being tied down (Table 8). Among husbands, work restrictions hardly varied in salience. But among wives, for whom work restrictions were higher in salience, they increased in salience at the low-fertility end. Being tied down, on the other hand, increased in salience from high- to moderate-fertility countries, and then increased even more sharply from moderate- to low-fertility countries. The large differences in perceived restrictions appeared, therefore, at the low end of the fertility continuum.

To further determine sensitivity to restrictions, respondents were asked: "Would you say that having children prevents/would prevent you from doing other things you want to do very often, sometimes, or not at all?" About 70 percent of wives and about 50 percent of husbands chose "very often" or "sometimes." West German wives and U.S. husbands were only slightly more likely than other wives and husbands to reply that children did interfere with other things. Unlike answers to the disadvantages question, the responses to this question provided at best minimal support for the prediction of increasing restrictions with lower fertility. It was observed, however, that some respondents, in replying to this question, had in mind children interfering with housework, which is a disvalue of children that should be distinguished from restrictions on enjoyable or personally satisfying activities (and was classified elsewhere in the coding scheme used). A way to identify these respondents was a follow-up question that asked what things children interfere with. Responses to the follow-up question were coded according to the scheme used for disadvantages of children. Those respondents who specifically mentioned a sense of being tied down (including specific personal or social restrictions) and inability to work were counted. The percentages for being tied down appeared in accord with the prediction, being sharply higher in the two low-fertility countries, though also somewhat high in Turkey. The percentages for work restrictions showed no clear trend. These results were essentially identical to results obtained from the disadvantages question.

Across Philippine regions (Table 9), perceived restrictions on the disadvantages question actually appeared to fall slightly. Work restrictions were not mentioned at all by Manila respondents, and being tied down was least salient, among wives, in Manila (though it was quite salient among husbands). For Korean cities and counties (Table 10), the salience of restrictions showed no linear pattern. Responses to the structured question also failed to show the expected trends, as did responses to the follow-up question. If restrictions do increase in salience only at low fertility levels, the absence of supporting trends across Philippine and Korean areas need not be taken as discouraging.

The nonlimiter-limiter comparisons, by contrast, led to confirmatory results (Table 11). Work restrictions, because they were generally so low in salience on the disadvantages question, did not produce large differences. But the other disvalue, being tied down, differentiated limiters and nonlimiters neatly for both wives and husbands at moderate and low fertility levels, as well as in Turkey–limiters mentioning these restrictions more often–but not in the other high-fertility countries. The structured question too separated nonlimiters and limiters, though mainly among wives rather than husbands. In Turkey, Singapore, and the United States, limiter wives more often agreed that children prevented their doing other things than nonlimiter wives. In all countries except Indonesia and the Philippines, more limiter wives mentioned being tied down. Restrictions on work, however, seemed to operate in the reverse direction, wherever they made any difference.

An alternate measure of the restrictions children impose is children's failure to satisfy values a person considers important in life. One might seek other sources of value satisfaction, which, given limitations on time and resources, would eventually compete with having children. Respondents indicated whether children would or would not satisfy the values they chose as most and second most important out of a list of nine general values (Tables 8 to 11). The percentages who said children would not provide value satisfaction were clearly higher (between 20 and 43 percent) in Singapore and the United States, at the low-fertility end, than in the other countries, where the figures ranged from 3 to 16 percent. Across sample areas in the Philippines and Korea, however, no trends were evident. Between nonlimiter and limiter husbands

TABLE 8 Indicators of rising aspirations, by country and sex: 1975–76

Indicator	Philippines	Turkey	Indonesia	Thailand	Korea	Taiwan	Singapore	United States	West Germany
WIVES									
Percentage mentioning disadvantages									
Tied down	7	11	15	6	26	15	30	68	80
Can't work	3	4	3	6	3	1	8	8	14
Percentage saying children prevent their doing other things	74	73	69	74	66	79	59	71	89
Percentage[a] mentioning being tied down	14	72	57	13[b]	38	24	60	87	129
Percentage[a] mentioning work restrictions	19	27	11	30[b]	25	44	21	15	12
Percentage saying children do not satisfy their									
Most important life-value	8	12	8	8	9	6	30	20	na
Second most important life-value	4	12	6	7	10	6	21	23	na
Percentage mentioning advantages									
Living through children	4	2	6	2	6	2	1	8	7
Achievement, power	5	10	2	1	33	6	4	40	14
Character, responsibility	2	0	0	1	1	0	1	4	10
Incentive to succeed	4	1	2	1	3	1	6	0	0
Fulfillment	1	4	0	0	7	4	4	33	36
Ratings of reasons for having children									
To be remembered	.01	.05	–.16	–.08	–.18	–.11	–.48	–.50	–.56
To make you proud	.01	–.10	.00	.08	.05	–.05	–.18	.31	.14
To do something	–.14	–.28	.01	u	.28	.03	–.21	.29	.81
To watch them grow	.06	.01	–.01	.12	.30	.14	–.02	.85	.27
To look up to you	–.25	–.20	.13	.12	–.33	.02	–.14	–.25	–.04
To be a better person	.03	–.22	–.18	–.05	–.27	–.37	–.57	.00	–.54

HUSBANDS									
Percentage mentioning disadvantages									
Tied down	7	9	7	3	18	9	19	59	na
Can't work	2	3	1	3	1	0	3	1	na
Percentage saying children prevent their doing other things	65	51	45	60	43	38	21	70	na
Percentage[a] mentioning being tied down	17	34	15	7[b]	25	19	22	96	na
Percentage[a] mentioning work restrictions	24	27	29	14[b]	9	22	4	3	na
Percentage saying children do not satisfy their									
Most important life-value	6	13	10	8	12	9	43	25	na
Second most important life-value	3	16	6	7	14	10	26	27	na
Percentage mentioning advantages									
Living through children	4	3	9	2	10	4	3	12	na
Achievement, power	3	10	2	1	36	4	4	36	na
Character, responsibility	2	0	1	2	4	1	3	2	na
Incentive to succeed	7	3	6	2	3	3	6	5	na
Fulfillment	3	5	0	1	8	5	3	21	na
Ratings of reasons for having children									
To be remembered	.02	.10	−.09	−.10	−.16	−.10	−.58	−.42	na
To make you proud	.05	.09	−.00	.11	.05	−.08	−.14	.41	na
To do something	−.11	−.27	−.00	u	.30	.07	−.15	.22	na
To watch them grow	.07	−.05	−.00	.15	.38	.15	−.06	.82	na
To look up to you	−.24	−.04	.14	.12	−.25	−.01	−.08	−.17	na
To be a better person	.06	−.07	−.10	.03	−.31	−.36	−.42	.11	na

na—not applicable to West German sample. u—unavailable.

[a] Bases for percentages included those who said children did not prevent their doing other things. Multiple responses were coded. The tabulation program used (SPSS) counted two responses coded in the same category once each, even if both were from the same person, which explains why percentages may exceed those in the preceding row or may exceed 100.

[b] Few Thai respondents answered this follow-up question, making these percentages artificially low. (Those who said children prevent some things but did not specify what they were were counted as missing, whereas those who said children do not prevent other things were not counted as missing.) If the percentages were adjusted for nonresponse, they would become 21 and 51 for wives and 20 and 43 for husbands.

TABLE 9 Indicators of rising aspirations, by region and sex: Philippines, 1975

Indicator	Bicol	Mindanao	East Visayas	Central Luzon	Cagayan	West Visayas	Central Visayas	Ilocos	Southern Tagalog	City of Manila
WIVES										
Percentage mentioning disadvantages										
Tied down	5	7	4	3	24	9	12	5	3	2
Can't work	3	0	6	2	8	4	5	1	1	0
Percentage saying children prevent their doing other things	84	89	71	71	74	81	88	88	62	59
Percentage mentioning being tied down	9	8	3	13	49	23	18	34	5	2
Percentage mentioning work restrictions	20	32	34	16	24	30	30	15	7	4
Percentage saying children do not satisfy their										
Most important life-value	3	8	9	9	17	12	11	3	4	11
Second most important life-value	5	6	5	5	9	5	4	0	2	9
Percentage mentioning advantages										
Living through children	4	5	5	4	1	5	6	7	2	4
Achievement, power	4	7	8	3	6	5	8	3	6	4
Character, responsibility	0	2	0	4	1	3	1	0	2	0
Incentive to succeed	5	9	3	5	5	4	6	0	4	0
Fulfillment	1	1	0	3	0	0	0	0	2	4
Ratings of reasons for having children										
To be remembered	−.01	.07	.04	−.00	.20	−.01	.05	.12	−.04	.02
To make you proud	−.03	−.01	−.55	−.02	.04	.03	.03	−.06	.09	.14
To do something	−.16	−.13	−.23	−.07	−.27	−.14	−.23	−.21	−.12	.01
To watch them grow	.05	−.02	−.05	.11	.02	.05	.01	.03	.11	.18
To look up to you	−.22	−.01	−.18	−.17	.20	.10	.03	.11	−.67	−.60
To be a better person	.10	.19	−.05	.02	−.04	−.09	.02	.15	.03	−.05

HUSBANDS										
Percentage mentioning disadvantages										
Tied down	6	4	8	6	5	10	8	0	4	25
Can't work	0	4	8	0	5	3	3	8	1	0
Percentage saying children prevent their doing other things	65	89	61	64	95	68	81	67	52	0
Percentage mentioning being tied down	18	21	0	9	81	19	17	25	6	0
Percentage mentioning work restrictions	32	64	25	14	19	21	56	33	10	0
Percentage saying children do not satisfy their										
Most important life-value	4	4	0	0	10	11	6	0	6	9
Second most important life-value	5	0	0	0	5	5	3	0	4	0
Percentage mentioning advantages										
Living through children	0	3	0	11	9	1	14	0	2	0
Achievement, power	3	7	0	3	5	1	6	0	4	0
Character, responsibility	0	3	8	3	0	4	0	8	0	17
Incentive to succeed	6	14	23	5	0	3	3	0	8	17
Fulfillment	3	3	0	0	5	1	6	8	3	0
Ratings of reasons for having children										
To be remembered	−.01	−.07	.21	.03	.02	−.01	.14	.25	−.00	−.25
To make you proud	−.01	.06	−.40	.08	−.11	.08	.06	−.27	.10	.33
To do something	−.01	−.18	−.40	.00	−.17	−.09	−.19	−.25	−.10	−.08
To watch them grow	.05	−.01	−.02	.19	.07	.01	−.05	.17	.09	.33
To look up to you	−.10	−.07	−.25	−.18	.16	.01	−.11	.08	−.63	−.42
To be a better person	.20	.20	.14	.13	.02	.02	.09	.08	.03	−.33

TABLE 10 Indicators of rising aspirations, by sample area and sex: Korea, 1976

Indicator	Hong-chon	Sosan	Naju	Jonju	Jinju	Chang-nyong	Seong-nam	Pusan	Daegu	Seoul
WIVES										
Percentage mentioning disadvantages										
Tied down	17	28	20	47	11	23	27	36	19	26
Can't work	1	2	5	4	5	4	7	1	1	3
Percentage saying children prevent their doing other things	54	63	73	74	64	59	73	68	59	72
Percentage mentioning being tied down	30	43	23	54	26	19	39	56	41	43
Percentage mentioning work restrictions	27	16	43	26	33	26	35	20	19	29
Percentage saying children do not satisfy their										
Most important life-value	11	11	5	7	7	3	12	11	10	10
Second most important life-value	9	12	3	11	5	6	10	10	14	11
Percentage mentioning advantages										
Living through children	8	2	9	7	5	12	6	7	5	6
Achievement, power	35	36	43	48	21	30	38	25	29	32
Character, responsibility	0	2	0	0	1	0	1	2	1	2
Incentive to succeed	1	2	5	0	1	2	9	2	4	2
Fulfillment	2	8	13	4	14	4	7	12	5	7
Ratings of reasons for having children										
To be remembered	−.07	−.22	−.04	−.12	−.16	.15	−.31	−.32	−.21	−.30
To make you proud	−.05	.08	.12	.08	−.01	−.08	.04	.06	.02	.15
To do something	.09	.32	.12	.34	.26	.10	.34	.39	.22	.39
To watch them grow	.20	.29	.21	.35	.25	−.01	.39	.41	.33	.39
To look up to you	−.31	−.33	−.24	−.44	−.36	−.22	−.24	−.37	−.33	−.41
To be a better person	−.38	−.31	−.04	−.32	−.22	−.16	−.23	−.32	−.25	−.34

HUSBANDS										
Percentage mentioning disadvantages										
Tied down	7	31	9	20	11	16	15	20	13	17
Can't work	0	1	3	0	0	0	4	0	0	1
Percentage saying children prevent their doing other things	50	39	36	45	39	33	40	63	34	53
Percentage mentioning being tied down	32	22	12	30	29	21	15	42	23	31
Percentage mentioning work restrictions	11	11	18	7	7	8	10	11	3	5
Percentage saying children do not satisfy their										
Most important life-value	17	10	3	10	14	12	13	9	23	13
Second most important life-value	14	10	6	15	10	15	13	18	10	20
Percentage mentioning advantages										
Living through children	4	8	6	7	7	19	15	23	15	9
Achievement, power	48	39	23	30	28	38	31	32	41	38
Character, responsibility	0	5	0	0	10	5	6	9	3	3
Incentive to succeed	4	5	6	3	0	0	8	0	3	3
Fulfillment	0	6	6	15	10	5	17	14	5	11
Ratings of reasons for having children										
To be remembered	−.02	−.27	.16	−.08	−.26	.22	−.38	−.37	−.01	−.24
To make you proud	.15	.11	.02	−.06	−.13	.02	.12	.01	−.04	.10
To do something	.22	.33	.19	.27	.25	−.00	.35	.46	.12	.47
To watch them grow	.15	.37	.25	.39	.36	.19	.50	.42	.35	.49
To look up to you	−.23	−.29	−.13	−.29	−.23	.02	−.27	−.23	−.24	−.35
To be a better person	−.54	−.30	−.28	−.24	−.40	−.13	−.36	−.23	−.16	−.39

TABLE 11 Indicators of rising aspirations among high-parity non-

	Philippines		Turkey		Indonesia	
Indicator	HPN	LPL	HPN	LPL	HPN	LPL
WIVES						
Percentage mentioning disadvantages						
Tied down	5	8	6	19	15	0
Can't work	3	2	2	6	1	0
Percentage who say children prevent their doing other things	77	75	59	77	72	56
Percentage mentioning being tied down	11	12	49	93	60	38
Percentage mentioning work restrictions	24	17	30	16	10	18
Percentage saying children do not satisfy their						
Most important life-value	11	11	8	12	10	3
Second most important life-value	3	7	1	16	3	9
Percentage mentioning advantages						
Living through children	4	1	3	2	4	6
Achievement, power	4	5	3	15	2	0
Character, responsibility	1	4	0	0	0	0
Incentive to succeed	2	4	0	1	2	6
Fulfillment	2	1	0	6	1	0
Ratings of reasons for having children						
To be remembered	.37	.02	−.17	−.14	.00	.02
To make you proud	−.16	.18	.04	.10	−.05	.03
To do something	−.44	−.24	.02	.01	−.12	−.24
To watch them grow	−.12	.07	−.02	−.08	.08	.08
To look up to you	−.25	−.13	.13	.15	−.16	−.42
To be a better person	−.49	−.20	−.17	−.05	.04	.04
HUSBANDS						
Percentage mentioning disadvantages						
Tied down	5	0	0	20	5	0
Can't work	3	17	0	3	1	0
Percentage saying children prevent their doing other things	68	47	28	37	56	55
Percentage mentioning being tied down	17	13	22	31	17	12
Percentage mentioning work restrictions	23	33	19	7	37	41

limiters and low-parity limiters, by country and sex: 1975–76

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
3	8	15	38	9	26	21	37	33	80
1	5	0	3	0	0	0	10	0	7
67	71	67	74	90	79	35	70	44	77
6	19	30	55	13	37	26	76	50	95
26	23	37	25	63	36	17	24	11	18
7	9	3	16	2	10	19	41	37	25
4	9	8	11	2	10	16	17	9	26
0	0	7	4	2	1	2	2	6	11
0	3	46	33	3	13	2	3	61	40
0	1	0	2	0	1	0	1	6	4
0	2	0	5	0	1	11	9	0	1
0	1	2	10	2	6	0	6	33	33
–.01	–.18	–.01	–.33	–.06	–.26	–.09	–.59	–.55	–.50
.01	.16	.09	.13	–.06	.02	–.08	–.16	.15	.30
u	u	.02	.38	–.03	.10	–.30	–.19	.37	.29
.07	.20	.22	.47	.02	.27	–.06	.11	.70	.86
.07	.10	–.38	–.40	.02	.01	–.08	–.09	–.18	–.26
.05	–.11	–.19	–.33	–.21	–.50	–.37	–.64	–.07	–.04
3	5	0	23	0	13	22	21	50	67
2	4	0	6	0	0	11	2	0	3
46	72	37	49	60	37	22	25	100	72
2	16	32	36	20	27	17	24	100	92
15	23	6	8	35	18	6	5	13	5

TABLE 11 *(continued)*

Indicator	Philippines		Turkey		Indonesia	
	HPN	LPL	HPN	LPL	HPN	LPL
HUSBANDS *(continued)*						
Percentage saying children do not satisfy their						
Most important life-value	8	21	7	16	6	27
Second most important life-value	5	7	9	3	9	6
Percentage mentioning advantages						
Living through childen	15	0	2	7	9	11
Achievement, power	0	0	0	11	4	0
Character, responsibility	2	0	0	0	0	0
Incentive to succeed	10	7	0	2	5	6
Fulfillment	2	0	0	11	0	0
Ratings of reasons for having children						
To be remembered	−.03	−.12	−.04	.01	.10	.05
To make you proud	.13	.40	.02	−.10	.10	.12
To do something	−.39	−.30	.02	−.05	−.07	−.28
To watch them grow	.18	.10	−.01	−.05	.07	.05
To look up to you	−.02	−.17	.11	.18	−.15	−.22
To be a better person	−.50	−.06	−.12	.06	.07	−.15

u—unavailable.
HPN—high-parity nonlimiters. LPL—low-parity limiters.

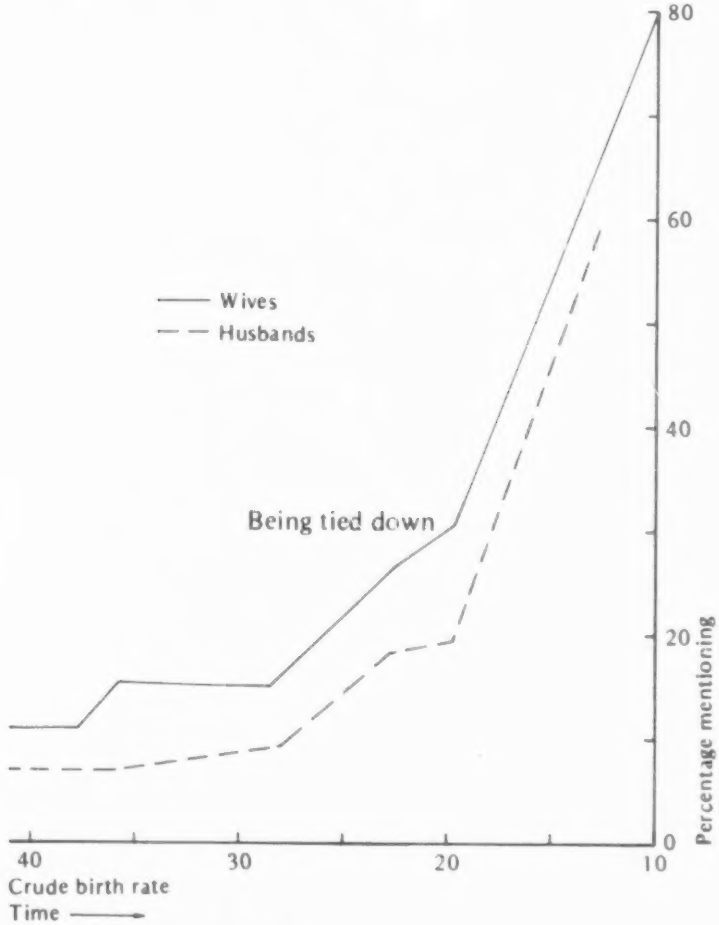
in the countries with lower fertility, there was a tendency for the latter to say, more often than the former, that children did not satisfy basic values. Among wives the comparisons were less consistent.

The overall pattern was clear and compelling: prediction P6 was supported but should be qualified in two ways. First, general restrictions on parents' activities did increase in salience, but not until lower levels of fertility were attained. Thus comparisons within countries at high and moderate fertility levels failed to show consistent differences, and comparisons among individuals also failed in high-fertility countries. In countries with lower fertility, on the other hand, comparisons between individuals did show differences in perceived restrictions. A second qualification was that work restrictions, when separated from other restrictions, showed on one question a slight upward trend for wives only at low fertility levels, but generally did not vary much. These results are illustrated in Figure 2, obtained by smoothing the data (Tukey, 1977:210–23) on perceived restrictions from the disadvantages question.

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
8	11	10	8	0	20	29	43	0	28
3	8	10	11	16	11	17	28	0	33
0	3	10	10	5	6	0	6	13	17
0	1	32	37	5	11	6	0	25	28
0	3	6	8	0	0	0	4	0	3
2	1	6	1	0	6	6	6	13	4
0	3	11	15	5	11	0	4	13	23
.06	−.19	.14	−.18	.08	−.14	−.31	−.67	−.69	−.42
.10	.14	.25	.15	−.07	−.07	.02	−.14	.31	.38
u	u	.15	.51	.03	.06	−.09	−.24	.56	.19
.13	.23	.05	.48	−.02	.25	−.15	.05	.93	.84
.12	.14	.09	−.38	.03	−.01	.02	−.18	−.44	−.22
.08	−.03	−.17	−.34	−.37	−.41	−.37	−.37	.18	.04

Psychological appreciation. Prediction P3 says that, as a consequence of rising aspirations, various psychological appreciation values should become more prominent. These values are diverse. Of the five coded from the advantages question (Table 8), aspirations should relate least equivocally to achievement and power motives, which should rise, and to the desire for self-fulfillment, which should also rise. Arguments could be made to link the other values to aspirations too, but these arguments would probably be more circuitous. All of the five values were less salient than economic benefits and rewarding interactions, except in the low-fertility countries (cf. Tables 4 and 16). Across high- and moderate-fertility countries there was no trend in these values, but the salience of a few values increased sharply for low-fertility countries. Self-fulfillment, in particular, was considerably more salient at the low-fertility end among both wives and husbands. Achievement and power were also relatively salient in the United States for both sexes, although they were equally salient in Korea. Character and responsibility were somewhat higher in low-fertility countries among wives.

FIGURE 2 Salience of being tied down, by fertility level, after smoothing



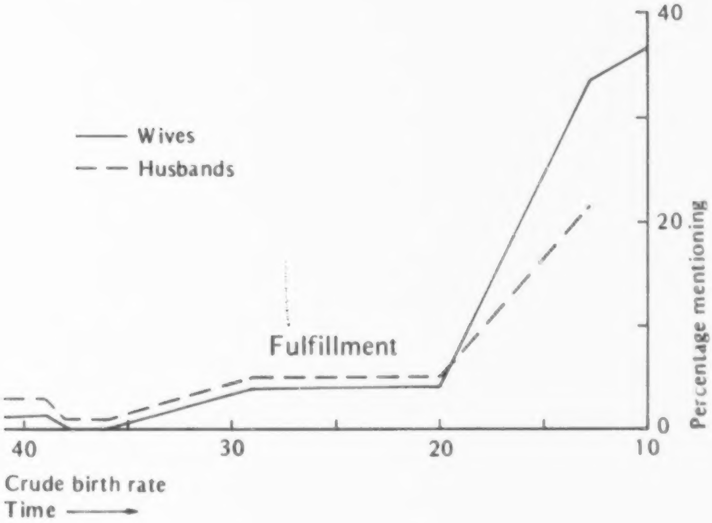
A slightly different set of six psychological appreciation values was among those rated in importance as reasons for having children. The trends in these values across countries were not consistent. Three values related to achievement, power, or self-fulfillment—to make you proud, to do something, to watch them grow—were more highly rated in the low- than in the high-fertility countries. Two other values—to be remembered, to be a better person—dropped in ratings at lower fertility levels. The last value—to look up to you—showed no trend. Being remembered and becoming a better person might be considered essentially status-related or social-reward values rather than personal-development values. In that case, these values would reflect changes in cultural norms more than changes in personal aspirations. With these two values excluded, the remaining psychological appreciation values do support some rise in aspirations.

Across Philippine and Korean sample areas there was little discernible pattern in the salience of the open-ended responses. Small trends that appeared were not consistent across the sexes. Among the value ratings there were some differences. Across Philippine regions, becoming a better person and being remembered had lower ratings in Manila for husbands, but not for wives. Of the remaining values, two—to make you proud and to watch them grow—were slightly more highly rated in Manila, but one—to look up to you—was much lower in ratings in both Manila and Southern Tagalog. Across Korean cities and counties, being remembered dropped in ratings at lower fertility levels, but becoming a better person did not. Of the remaining values, some slight rise in ratings appeared for two—to do something and to watch them grow. The comparisons across communities on the structured questions, therefore, resembled the comparisons across countries: being remembered and becoming a better person declined with lower fertility, but some of the other values rose in ratings. These results, however, were less clear-cut.

Between high-parity nonlimiters and low-parity limiters the differences on the advantages question were few and scattered, though probably not random. For instance, limiters among both wives and husbands in Turkey mentioned achievement or power more often than nonlimiters. The other differences appeared only for one sex and not the other. Among the ratings, being remembered was more important for nonlimiters in the majority of cases, and becoming a better person was also generally more important among nonlimiters, though there were more exceptions. Of the other values, one—to watch them grow—was definitely more important among limiters. Two others—to make you proud and to do something—were more important among limiters for wives only. For husbands the reverse was slightly more likely.

Prediction P3 has some weak support. Particular psychological appreciation values did increase in salience at low fertility levels across countries. Among the advantages of having children, self-fulfillment rose in salience (Figure 3 represents this in smoothed fashion), as did achievement and power. Among rated values, to watch children grow, to make you proud, and to do something (values related to achievement, power, and self-fulfillment) rose in importance, and also distinguished individuals with lower fertility, which other values did not.

FIGURE 3 Salience of fulfillment by fertility level, after smoothing



Two of the structured values—being remembered and becoming a better person—appeared to be more group-oriented rather than personal, and consistently gave contradictory results. That there is some, even slight, effect in the predicted direction could be taken as encouraging. It is not being argued, after all, that these effects produce the fertility transition. In fact, they operate in the reverse direction, and merely indicate that aspirations relevant to having children do change.

Financial costs. Both the rising aspirations factor and the conjugal family factor imply that financial costs of children rise in the fertility transition, in the first case because aspirations for children rise and in the second case because costs are borne more directly by parents. Predictions P4 and S4, therefore, are identical. If costs can be shown to rise at lower fertility levels, either one or both of these factors may be the explanation.

Referring to Table 12, we find, however, that costs did not rise. Responses on the open-ended question specially mentioning the cost of education were separated from responses mentioning other costs, these others, in the aggregate, being substantially more common. Concern with these other costs neither increased nor decreased across fertility levels. Concern with the cost of education, on the other hand, actually decreased from high-fertility countries to moderate- and low-fertility countries. This contradicts both predictions, but cannot be taken as an isolated finding. Using the same question on disadvantages, Arnold and others (1975:52) found financial costs to be less salient in Japan and Hawaii and more salient in Korea, Taiwan, the Philippines, and Thailand, even when respondents were divided into urban middle-class, urban lower-class, and rural groups.

Within the Philippines across regions (Table 13), financial costs were least salient among disadvantages in the highest-fertility region and increased in salience as fertility fell, though they fell again in salience in the lowest-fertility regions. Within Korea (Table 14), the trend was toward fewer responses mentioning financial costs at lower levels of fertility, particularly in the cities of Seoul, Daegu, and Pusan. The cost of education specifically also showed a slight decline. These patterns held for both wives and husbands. It does seem clear that the salience of perceived costs, on this measure, did not rise and, most probably, actually fell.

Moving to the individual level provides even more striking disconfirmation of the predictions (Table 15). Particularly among husbands—who in each country mentioned costs among disadvantages more often than wives—but also among wives, fewer low-parity limiters than high-parity nonlimiters mentioned financial costs. A large percentage difference in this direction appeared in five countries among husbands, in two countries among wives. The differences appeared equally in high-fertility countries, in moderate-fertility countries, and in low-fertility countries. Similar differences appeared in Korea for the cost of education. Respondents limiting their families showed less concern with financial costs than those not limiting their families.

How might these results be interpreted? One possibility is that the salience of financial costs depends not on the absolute level of such costs but on their level relative to income. Since incomes are usually higher in low-fertility areas, the perceived cost of children may actually decline. In relation to the schema presented earlier, we might say that observations of the effects of the higher aspirations factor and the emergence of the conjugal family factor are complicated by the simultaneous operation of the higher incomes factor. This interpretation would account for the pattern across countries and across regions, but it implies that the effects of these two factors on perceived costs of children are not strong enough to overcome the effect of the incomes factor, and therefore cannot by themselves explain the fertility transition. (These two factors have, however, other effects, some still to be considered, which conceivably could be stronger.) A structured question

TABLE 12 Perceptions of financial costs of children and childrearing demands, by country and sex of respondents: 1975–76

Indicator	Philippines	Turkey	Indonesia	Thailand	Korea	Taiwan	Singapore	United States	West Germany
WIVES									
Percentage mentioning financial costs among disadvantages									
Cost of education	12	6	13	3	6	1	1	2	0
Other financial costs	35	41	46	17	31	35	44	42	19
Percentage saying a couple should have									
More children than they can afford (if they want them)	2	1	6	3	4	1	0	8	na
Only the number they can afford	78	81	65	74	58	21	35	87	na
Fewer than they can afford	20	18	29	23	38	79	65	6	na
Percentage considering three children to be some financial burden	54	81	56	80	85	67	83	70	98
Percentage mentioning childrearing demands among disadvantages									
More work	2	33	18	3	0	33	19	6	10
Emotional strain	26	23	20	5	15	68	67	24	34
Health, pregnancy	3	7	1	3	1	0	0	1	1
Discipline	52	24	22	7	27	15	39	9	0
Child's sickness	15	15	60	6	15	9	0	6	0
Worry over child's future	4	4	5	1	9	5	0	7	0
Other childrearing problems	14	0	5	14	8	0	0	1	12
Percentage saying children cause moderate or a lot of worry and strain	68	78	78	67	61	88	61	72	76

HUSBANDS									
Percentage mentioning financial costs among disadvantages									
Cost of education	12	13	14	4	6	2	1	4	na
Other financial costs	39	55	58	25	43	41	58	47	na
Percentage saying a couple should have									
More children than they can afford (if they want them)	3	1	4	3	6	1	0	7	na
Only the number they can afford	74	86	73	79	54	17	33	81	na
Fewer than they can afford	23	13	23	19	40	82	67	12	na
Percentage considering three children to be some financial burden	41	82	48	74	84	66	77	66	na
Percentage mentioning childrearing demands among disadvantages									
More work	1	13	9	3	0	17	7	3	na
Emotional strain	26	9	16	6	12	65	53	25	na
Health, pregnancy	2	1	0	1	0	0	0	1	na
Discipline	55	22	24	8	19	19	36	7	na
Child's sickness	18	8	49	4	15	5	0	6	na
Worry over child's future	4	7	6	1	8	5	1	7	na
Other childrearing problems	14	0	4	11	11	0	0	2	na
Percentage saying children cause moderate or a lot of worry and strain	63	59	73	58	51	80	38	61	na

na—not applicable to West German sample.

TABLE 13 Perceptions of financial costs of children and childrearing demands, by region and sex of respondents: Philippines, 1975

Indicator	Bicol	Mindanao	East Visayas	Central Luzon	Cagayan	West Visayas	Central Visayas	Ilocos	Southern Tagalog	City of Manila
WIVES										
Percentage mentioning financial costs among disadvantages										
Cost of education	14	12	18	5	6	17	17	5	12	12
Other financial costs	24	34	54	24	40	49	46	36	29	26
Percentage saying a couple should have										
More children than they can afford (if they want them)	1	3	6	1	2	1	2	7	2	2
Only the number they can afford	73	51	62	83	82	95	34	68	92	93
Fewer than they can afford	26	46	32	16	16	3	64	25	7	4
Percentage considering three children to be some financial burden	42	61	52	61	61	50	67	79	44	61
Percentage mentioning childrearing demands among disadvantages										
More work	0	2	9	1	4	5	2	0	1	0
Emotional strain	33	25	31	19	68	32	29	12	18	9
Health, pregnancy	5	22	0	3	1	1	4	1	1	0
Discipline	72	30	46	50	36	44	47	52	64	53
Child's sickness	10	34	21	8	15	17	30	3	10	5
Worry over child's future	5	2	6	4	5	4	2	3	5	7
Other childrearing problems	11	9	10	14	18	24	10	16	11	14
Percentage saying children cause moderate or a lot of worry and strain	61	78	61	67	71	77	80	81	58	62

TABLE 15 Perceptions of financial costs of children and childrearing country and sex: 1975–76

	Philippines		Turkey		Indonesia	
Indicator	HPN	LPL	HPN	LPL	HPN	LPL
WIVES						
Percentage mentioning financial costs among disadvantages						
Cost of education	13	16	4	9	13	12
Other financial costs	37	26	27	32	47	50
Percentage saying a couple should have						
More children than they can afford (if they want them)	3	1	3	0	6	6
Only the number they can afford	78	80	79	79	71	59
Fewer than they can afford	19	19	18	21	23	35
Percentage considering three children to be some financial burden	40	89	51	93	43	82
Percentage mentioning childrearing demands among disadvantages						
More work	1	3	18	30	22	12
Emotional strain	25	19	27	25	23	9
Health, pregnancy	3	5	4	6	1	0
Discipline	51	52	29	27	16	29
Child's sickness	16	17	8	9	64	68
Worry over child's future	1	6	0	4	5	9
Other childrearing problems	12	14	0	0	5	3
Percentage saying children cause moderate or a lot of worry and concern	73	65	77	74	81	79
HUSBANDS						
Percentage mentioning financial costs among disadvantages						
Cost of education	10	17	10	8	14	11
Other financial costs	35	25	126[a]	45	65	56
Percentage saying a couple should have						
More children than they can afford (if they want them)	8	0	0	0	5	6
Only the number they can afford	82	67	93	92	75	61
Fewer than they can afford	10	33	7	8	20	33
Percentage considering three children to be some financial burden	15	93	67	99	30	78

demands among high-parity nonlimiters and low-parity limiters, by

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
3	1	23	4	0	0	0	0	0	1
16	14	38	23	33	29	49	40	44	38
9	1	8	3	3	0	0	0	11	8
80	73	53	57	44	10	61	17	89	84
11	26	39	40	53	90	39	83	0	8
65	90	83	93	39	77	70	86	11	79
5	2	0	0	26	28	13	20	6	6
3	5	21	15	43	65	61	61	17	29
4	2	0	0	2	0	0	0	0	1
5	8	40	15	15	20	36	50	0	11
4	9	11	16	5	11	0	0	6	9
0	3	13	8	7	5	3	0	0	6
17	11	10	6	0	0	0	0	0	1
63	69	65	54	90	83	55	66	67	76
3	3	32	2	0	2	0	0	0	3
19	25	53	24	60	45	50	53	63	47
14	1	0	0	0	1	0	0	13	9
75	81	84	52	21	2	78	21	87	82
11	18	16	48	79	96	22	79	0	9
58	87	90	90	58	85	39	84	25	75

TABLE 15 *(continued)*

Indicator	Philippines HPN	Philippines LPL	Turkey HPN	Turkey LPL	Indonesia HPN	Indonesia LPL
HUSBANDS *(continued)*						
Percentage mentioning childrearing demands among disadvantages						
More work	3	0	26	14	13	6
Emotional strain	28	42	5	7	17	17
Health, pregnancy	0	8	0	2	0	0
Discipline	57	50	2	27	19	22
Child's sickness	13	50	0	13	42	55
Worry over child's future	3	0	0	5	6	11
Other childrearing problems	5	17	0	0	4	0
Percentage saying children cause moderate or a lot of worry and strain	81	73	31	40	74	61

HPN—high-parity nonlimiters.

LPL—low-parity limiters.

a The tabulation program used (SPSS) counted two responses coded in the same category once each, even if both were from the same person, which explains why percentages may exceed 100.

provides a limited test of this interpretation. Respondents were asked: "Do you think a couple should have *more children than they can afford* if they want them, should they have *only* the number of children they can afford, or should they have *fewer* than that?" This question provides some control for differences in income level. Relatively few, between 0 and 8 percent, chose "more children." The highest percentages, in a complete reversal from the expectation, were in the United States. Between 6 and 82 percent chose "fewer children," and, again contrary to the expectation, the lowest percentages were in the United States. The percentages choosing "fewer" were considerably higher in the moderate-fertility rather than the high-fertility countries, a finding requiring further comment below.

Across sample areas within the Philippines and Korea, no real trend could be detected. If anything, those contending that couples should have fewer children than they can afford decreased with lower fertility, but this was only a marginal tendency. Across individuals, the situation was different. Limiters were consistently more likely than nonlimiters to insist that couples have fewer children than they can afford. This was especially true in the moderate-fertility countries, but also true in other cases.

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
2	0	0	0	10	17	0	9	0	4
3	13	16	18	75	57	56	48	25	32
1	0	0	0	0	0	0	0	0	0
3	13	42	18	10	26	61	50	0	7
9	3	20	18	5	7	0	0	0	4
0	1	0	4	5	2	6	0	0	5
15	7	26	6	0	0	0	0	0	0
52	67	58	58	100	85	28	43	63	64

Apart from this last finding, the idea that rising incomes mask a real increase in perceived costs was not supported. The last finding, that limiters were more likely to favor restricting childbearing relative to income, suggests that perceived costs may be a factor in differential fertility at the individual level, though it does not tie differences in perceived costs to the fertility transition. A second interpretation of the failure of perceived costs to increase may be considered next.

When considering the disadvantages of children, individuals may keep different numbers of children in mind. Those with large families may be thinking of the disadvantages of many children, those with small families of the disadvantages of only a few children. To investigate this possibility, respondents were asked whether they considered specific numbers of children to constitute some financial burden. The percentages of those who thought that three children constituted some financial burden bore little resemblance to percentages for the salience of financial costs. We would expect these percentages to show some relation to fertility levels, rising at lower levels. This was not uniformly the case. Almost all of the West German wives considered three children a burden, as compared with about half of the Philippine and Indonesian respondents. However, for the other low-fertility country, the

United States, the corresponding percentages were only 70 percent for wives and 66 percent for husbands, less than in four other countries with higher fertility. The greatest perceived financial burden seemed to be at moderate fertility levels,[10] which parallels the results on the previous question. It may be possible to argue that the perceived burden of children rises sharply at an early stage in the transition, but a continuing rise beyond the early stage is clearly not indicated.[11]

Across Philippine regions the highest percentages of respondents considering three children to be a burden were in the Ilocos region, with relatively low but not the lowest fertility. In Korea, too, there was an absence of the expected pattern. Across individuals, however, the situation was sharply different. In every case except one, there were large differences between high-parity nonlimiters and low-parity limiters, with the latter much more likely to consider three children a financial burden. Among husbands in Turkey, for instance, there was a difference of 32 percentage points between limiters and nonlimiters who considered three children a burden. (In contrast, *fewer* limiters than nonlimiters mentioned financial costs as a disadvantage of children, and the difference between them was over 50 percentage points.) Or again, among U.S. husbands, 50 percentage points more limiters than nonlimiters considered three children a burden (versus 16 percentage points fewer limiters who mentioned financial costs).

These contradictions between the measures lend support to the idea that, when respondents mentioned financial disadvantages, they had different numbers of children in mind. With number of children constant, the data indicated a negative link between the perception of costs and individual fertility. The data did not support any link between the perception of costs and area-wide or country-wide fertility levels. Unlike the two previous predictions from the rising aspirations factor, Prediction P4 (and the identical Prediction S4) are disconfirmed, and, overall, perceptions of the financial costs of children appear not to rise in the fertility transition (Figure 4).

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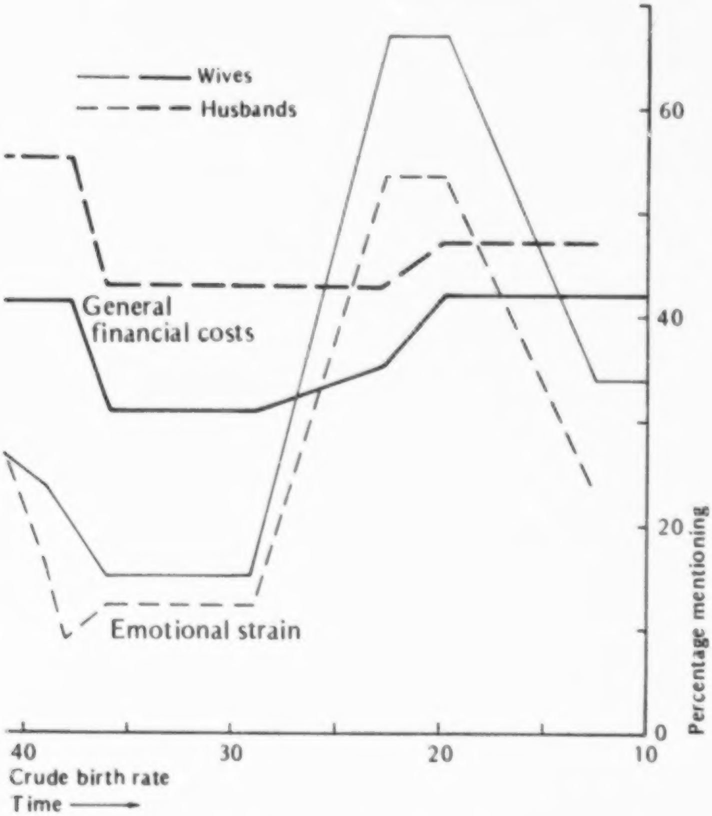
[10] Arnold and others (1975:43–47) found a similar pattern with smaller, selected samples in six countries. Hawaii and Japanese respondents were less likely to perceive three children as a heavy financial burden, Korean respondents were much more likely to do so, and Thai and Taiwanese respondents were in between. Philippine respondents, however, fell outside the pattern, being the least likely to consider three children a heavy burden.

[11] If one looks, alternatively, at the percentages who considered two or four children to be some financial burden, the patterns are no more supportive of the predictions.

FIGURE 4 Salience of general financial costs and emotional strain by fertility level, after smoothing



Childrearing demands. As with financial costs, childrearing demands should become heavier if either the rising aspirations factor or the conjugal family factor is operative. Predictions P5 and S5 must therefore be considered together. Seven disvalues among those coded from the disadvantages question are classified under childrearing demands. The emotional strain of childrearing is the one that should most clearly be affected. Greater ambitions for children and greater closeness to them should mean more tension in caring for them, though not necessarily more actual work. Some of the other disvalues, like concern with children's sickness, should actually decrease in salience for other reasons.

Generally there were only slight trends in these disvalues on the open-ended question (Table 12). Emotional strain did become more salient, but it was highest at moderate fertility levels and about as salient at high and at low fertility levels. Two disvalues, sickness and worry about discipline, dropped considerably in salience, though not consistently. Both disvalues were lower in salience at the low-fertility end, but at the high-fertility end their salience was quite variable. Another disvalue, concerns tied to the mother's health or to pregnancy, had low salience to begin with and practically disappeared as a concern at moderate and low fertility levels. Another way of looking at the data is to consider which of these seven disvalues was most salient in each country. In the high-fertility countries, either children's sickness or discipline was generally most salient. In the moderate- and low-fertility countries (except for Korea), emotional strain was the most salient.

A similar pattern could not be found across Philippine or Korean sample areas. For the Philippines, emotional strain declined slightly across regions, as did concern with the additional work children require. The other disvalues did not change in salience. The most frequently mentioned of these disvalues in most areas was disciplinary problems. For Korea, discipline clearly declined in salience and another disvalue, worry over the child's future, showed a possible decline. As with the cross-national patterns, there was no clear support for the predictions.

The comparisons between nonlimiters and limiters were no more enlightening. For wives, emotional strain was more salient among limiters in Taiwan and the United States, but among nonlimiters in Indonesia. For husbands, emotional strain was more salient among limiters in the Philippines and Thailand, but among nonlimiters in Taiwan. Discipline and sickness were not consistently higher in salience for either limiters or nonlimiters.

One structured question provides further negative evidence. Respondents indicated how much worry and emotional strain children cause. From 38 to 88 percent admitted at least a moderate amount of worry and strain, but these ratings showed no consistent variation across fertility levels, whether comparisons were made across countries, within countries, or between individuals.

None of the disvalues under childrearing demands provided satisfactory support for the predictions. There was some indication that emotional strain, by itself, increased in salience, particularly in comparison with such disvalues as discipline and sickness, and particularly in moderate-fertility countries (Figure 4). As with financial costs, respondents may assess childrearing demands in relation to the number of children they expect, prefer, or are more familiar with. The tendency for emotional strain to be more salient among limiters than nonlimiters might have been stronger if all respondents had the same number of children in mind. It appears, then, that two predictions from the rising aspirations factor are confirmed but two others are not, a discrepancy to be discussed in the concluding section.

Emergence of the conjugal family

The shift from extended families to conjugal families should have two effects on values and disvalues: costs are shifted directly onto the parents rather than being borne by the kin group as a whole, and emotional attachments within the family are intensified. It has just been shown that the first of these effects cannot explain the transition; costs and childrearing demands were not perceived as heavier at lower fertility levels. The second effect is related to two predictions, S2 and S7, which will now be considered.

Rewarding interactions. Prediction S2 says that companionship from children and the marital bond should increase in prominence. If this happens, the value of children should rise; nevertheless, this effect would indicate that the conjugal family factor, which also has reverse effects, is operative. The four rewarding-interactions values coded from the advantages question may be examined (Table 16). The companionship and love that children provide increased in salience from high-fertility to moderate-fertility to low-fertility countries, as predicted. The trend was clearer and stronger among husbands (as might be expected where men are more strongly affected by depersonalization of occupational roles), but also appeared among wives. The values of happiness and play, fun, and distraction that children bring are related to companionship but are more difficult to interpret. For three countries, happiness was not reported as an answer; it was either not mentioned or was coded in a more specific category, occasionally under play, fun, and distraction. When happiness and play, fun, and distraction were considered together rather than separately, a rise in salience appeared from high- to moderate-fertility countries (though the Philippine respondents also mentioned these values often), followed by a slight drop in salience from moderate- to low-fertility countries. The last value in this set, children strengthening the marital bond, showed the predicted rise, more notably between moderate- and low-fertility countries.

In contrast to the clarity with which predictions were supported across countries, across regions within countries the patterns were less clear. In the Philippines, the marital bond was more salient in Manila than elsewhere (Table 17). None of the other values showed this trend,

HUSBANDS										
Percentage mentioning financial costs among disadvantages										
Cost of education	19	14	15	6	5	10	19	25	8	25
Other financial costs	16	61	69	18	57	59	53	42	21	37
Percentage saying a couple should have										
More children than they can afford (if they want them)	0	15	0	0	9	1	6	17	2	0
Only the number they can afford	62	30	69	87	77	91	31	50	87	75
Fewer than they can afford	38	55	31	13	14	7	63	33	11	25
Percentage considering three children to be some financial burden	23	48	69	42	64	32	58	75	34	25
Percentage mentioning childrearing demands among disadvantages										
More work	6	4	8	0	5	0	0	0	0	0
Emotional strain	31	25	23	15	62	35	19	8	20	0
Health, pregnancy	0	11	0	3	0	0	0	0	2	0
Discipline	47	21	39	70	48	47	56	33	72	63
Child's sickness	6	46	31	9	24	15	39	0	11	25
Worry over child's future	6	4	0	9	5	6	0	0	4	0
Other childrearing problems	19	4	15	18	19	18	11	8	12	0
Percentage saying children cause moderate or a lot of worry and strain	67	83	54	66	86	65	61	58	53	67

TABLE 14 Perceptions of financial costs of children and childrearing demands, by sample area and sex of respondents: Korea, 1976

Indicator	Hong-chon	Sosan	Naju	Jonju	Jinju	Chang-nyong	Seong-nam	Pusan	Daegu	Seoul
WIVES										
Percentage mentioning financial costs among disadvantages										
Cost of education	11	7	8	3	5	9	6	2	3	5
Other financial costs	34	30	41	53	37	32	37	23	22	22
Percentage saying a couple should have										
More children than they can afford (if they want them)	5	4	7	4	4	8	2	5	1	3
Only the number they can afford	58	51	55	74	71	59	65	53	63	58
Fewer than they can afford	37	45	39	22	25	33	33	42	36	40
Percentage considering three children to be some financial burden	93	82	79	78	91	78	91	86	81	91
Percentage mentioning childrearing demands among disadvantages										
More work	0	0	0	0	0	1	0	0	0	1
Emotional strain	12	18	16	11	17	15	17	9	16	14
Health, pregnancy	0	0	0	1	0	1	1	1	1	1
Discipline	35	25	50	35	33	41	17	14	20	21
Child's sickness	7	21	15	21	15	17	19	13	13	11
Worry over child's future	5	9	20	12	15	9	7	4	10	4
Other childrearing problems	3	9	13	21	4	9	6	3	7	6
Percentage saying children cause moderate or a lot of worry and strain	71	64	71	61	51	53	63	59	44	62

HUSBANDS										
Percentage mentioning financial costs among disadvantages										
Cost of education	15	3	12	0	11	8	4	0	3	6
Other financial costs	48	49	56	50	41	42	50	30	30	33
Percentage saying a couple should have										
More children than they can afford (if they want them)	0	5	21	5	0	5	6	5	0	6
Only the number they can afford	59	47	29	55	69	54	58	55	72	61
Fewer than they can afford	41	48	50	40	31	41	35	41	28	33
Percentage considering three children to be some financial burden	85	83	81	76	80	80	92	89	83	85
Percentage mentioning childrearing demands among disadvantages										
More work	0	0	0	0	0	0	0	0	0	0
Emotional strain	7	11	12	15	7	18	13	10	13	10
Health, pregnancy	0	0	0	0	0	0	0	0	3	0
Discipline	26	17	44	23	22	24	17	10	13	10
Child's sickness	11	14	18	20	19	13	23	10	13	12
Worry over child's future	11	7	21	15	11	8	4	0	11	4
Other childrearing problems	7	11	15	30	4	18	8	0	8	8
Percentage saying children cause moderate or a lot of worry and strain	59	52	47	60	31	37	52	73	47	51

however, and companionship actually appeared to decline in salience. In Korea, a slight decrease for companionship and increase for the marital bond with lower fertility appeared, but neither was unambiguous (Table 18).

Across individuals within countries the patterns were supportive of the predictions (Table 19). In three out of eight countries, a large difference appeared among wives between high-parity nonlimiters and low-parity limiters on the companionship value, and in one other country the difference was almost large enough to be noted. In each case the difference was in the predicted direction. Among husbands, however, the differences were as predicted only for Turkey; for moderate- and low-fertility countries, the differences were reversed, low-parity limiters mentioning this value less often than high-parity nonlimiters. It should be noted that the comparisons among husbands were based on fewer cases, and were less reliable. For the two values of happiness and play-fun-distraction, all the large percentage differences among wives and all but one of these differences among husbands were in the predicted direction. For the last value in this set, the marital bond, one disconfirming instance again appeared among husbands (in the United States), but generally low-parity limiters among both wives and husbands mentioned this value more often.

Generally similar results could be found from structured questions. Six rewarding interactions values were rated: not to be lonely, to bring love, to be needed, fun, to complete the family, and to strengthen the marital bond. The ratings for these values generally went up at lower fertility levels. Wives' ratings for fun, for instance, were between −.06 and .16 in the high-fertility countries, between .13 and .24 in the moderate-fertility countries, and between .65 and .89 in the low-fertility countries. Not all the patterns were as convincing as this: to bring love rose very sharply, but only at low fertility levels; not to be lonely and to complete the family were higher at moderate than at low fertility levels; and the marital bond was surprisingly low in the United States. Overall, nevertheless, some rise in the importance of rewarding interactions was evident.

Across Philippine regions, similar trends could not be found. The only noteworthy aspect was that Manila husbands gave particularly high ratings to three values, to bring love, to complete the family, and to strengthen the marital bond. Across Korean cities and counties, a slight upward trend could be found in two values, to bring love and to be needed, and a firmer upward trend in the marital bond value.

The nonlimiter-limiter comparisons strongly supported the prediction.

TABLE 19 Indicators of the emergence of the conjugal family among 1975–76

Indicator	Philippines HPN	Philippines LPL	Turkey HPN	Turkey LPL	Indonesia HPN	Indonesia LPL
WIVES						
Percentage mentioning advantages						
Companionship, love	11	20	27	31	10	9
Happiness	42	62	0	0	20	12
Play, fun, distraction	11	24	8	23	7	0
Marital bond	5	13	13	17	7	12
Ratings of reasons for having children						
Not to be lonely	.06	.16	.04	.25	.03	.01
To be needed	−.10	−.11	−.58	−.43	−.19	−.20
To bring love	.17	.16	−.06	.38	.08	.13
Fun	.11	.16	.14	.21	.08	−.02
To complete family	.08	.12	.27	.34	.04	.07
Marital bond	.17	.21	−.09	.33	.10	.10
Percentage mentioning marital strains among disadvantages	2	3	2	1	1	0
HUSBANDS						
Percentage mentioning advantages						
Companionship, love	12	7	2	24	10	17
Happiness	34	50	0	0	16	6
Play, fun, distraction	10	21	8	41	11	11
Marital bond	5	50	15	19	7	6
Ratings of reasons for having children						
Not to be lonely	.02	−.08	−.04	.04	−.00	.01
To be needed	−.02	−.02	−.67	−.25	−.10	−.05
To bring love	.10	.18	−.01	.27	.03	.12
Fun	.02	−.02	−.02	.16	.06	.12
To complete family	.02	.25	.13	.27	.01	−.05
Marital bond	.05	.38	−.01	.28	.10	.18
Percentage mentioning marital strains among disadvantages	3	0	0	4	0	0

HPN—high-parity nonlimiters.
LPL—low-parity limiters.

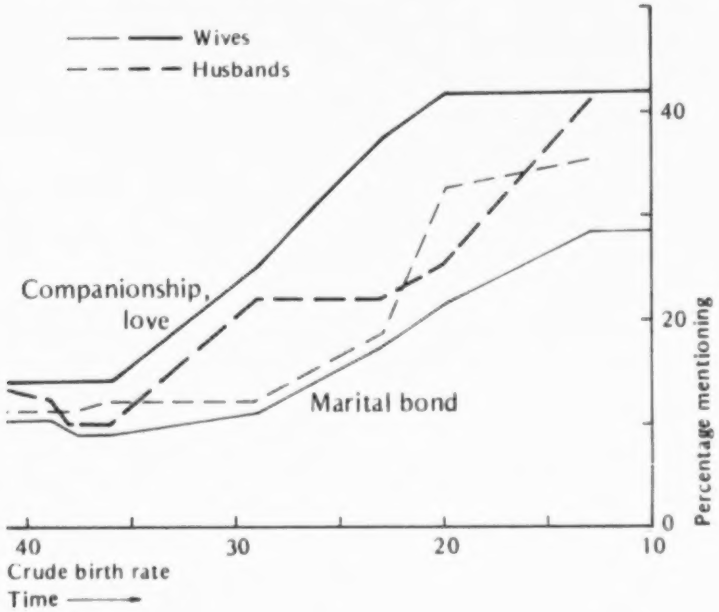
In the three moderate-fertility countries, limiters gave these values ratings at least .10 higher than nonlimiters in 32 out of 36 comparisons. Among the high-fertility countries, the record in Thailand and Turkey was almost as good, but in the Philippines support for the prediction was weaker and in Indonesia there was no support, but no contradichigh-parity nonlimiters and low-parity limiters, by country and sex:

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
3	19	15	21	24	34	29	41	50	51
5	13	33	53	0	0	71	85	0	0
1	0	3	1	80	83	9	23	61	53
0	4	17	23	0	18	5	23	28	28
–.12	.03	.30	.33	.19	.36	.38	.59	.15	.04
–.08	.01	–.06	.19	–.18	–.30	.15	.30	.43	.31
.05	.22	–.10	.31	–.03	.17	.01	.30	.87	.92
–.12	.03	.15	.21	.06	.21	–.03	.35	.65	.66
–.02	.17	.29	.41	.17	.42	.40	.55	.48	.33
–.05	.14	–.03	.12	–.19	.17	.11	.44	–.24	–.07
0	0	0	6	0	2	0	1	6	7
5	8	42	6	35	20	29	34	63	32
7	18	43	56	0	0	59	85	0	0
2	3	0	4	75	70	23	19	37	51
1	11	10	22	10	12	23	37	50	38
–.11	–.03	.19	.38	.23	.44	.41	.54	.18	–.09
–.12	–.01	.04	.20	–.37	–.32	.13	.26	.43	.19
–.01	.10	.20	.45	–.02	.18	–.04	.24	.93	.92
.00	–.03	.10	.23	.03	.36	.13	.36	.68	.69
–.03	.22	.15	.32	.23	.55	.35	.64	.68	.46
–.02	.15	.00	.30	.08	.27	.35	.60	.18	.15
0	1	0	9	0	0	0	3	0	7

tory trends either. However, the low-fertility country, the United States, did supply contradictory trends: three values, not to be lonely, to be needed, and to complete the family, were more highly rated by nonlimiters among both wives and husbands.

Overall, Prediction S2 was reasonably well supported, as Figure 5 in-

FIGURE 5 Salience of marital bond and companionship, love by fertility level, after smoothing



dicates with a smoothed plot for two of the values. The differences in salience on the open-ended question were clearest and most consistent for the marital bond, and stronger toward the low-fertility end. Comparisons among the other three values from the open-ended question were complicated by overlapping categories, but generally they also became more salient with low fertility. On the structured measures, where values were distinguished differently, a generally supportive pattern was also found, with several values rising very sharply at low fertility levels. It is notable that respondents who wanted fewer children actually mentioned interaction rewards more often and those who wanted more children mentioned these values less often, which should discourage any simple-minded attempt to add up different values attached to children. Why the contrasts were weaker across Philippine and Korean sample areas is not clear. Within both countries the contrasts between high-parity nonlimiters and low-parity limiters were usually as predicted, but the contrasts between communities and regions were largely blurred. Unlike economic values, which are limited by the opportunities available in each community, interaction rewards may have greater latitude for variation within communities, which may partly explain the findings.

Marital strain. From the emergence of the conjugal family factor, the next prediction, S7, follows, that marital strain due to children should be more prominent at lower fertility levels. Since marital strain was quite low in salience on the disadvantages question, not being mentioned at all in two country samples, it is unlikely that concern about this problem exerts a major influence on fertility. Marital strain was somewhat more salient in the United States, at the low-fertility end, but not in West Germany, and also more salient in Korea. Across Philippine regions, marital strain received little mention, and hardly varied in frequency. Across Korean regions, salience was higher, but linear trends were again absent. Between nonlimiters and limiters, the single difference that approached 10 percentage points was among Korean husbands, limiters more often mentioning marital strain. Prediction S7 had at best minimal support in comparisons across countries, but may not have been adequately tested because of its low salience on the question used.

Weakening cultural props for high fertility

Social benefits. The next prediction, C1, involving weakening cultural props, covers three values of children: the family name or family line, religious and social obligations, and adult status and social norms. The last two of these were substantially less salient among advantages of children than the economic benefit values, which are in the same instrumental assistance cluster (Table 20). Few respondents considered social pressures to be a salient motive for childbearing.[12] Nor were any of the three values more salient for high-fertility countries. The family name or family line varied considerably in salience, being higher among husbands than wives and in Taiwan and Indonesia than elsewhere. But no trend appeared across fertility levels. Religious and social obligations were higher in Turkey, but no higher in the other high-fertility countries than elsewhere. Adult status and social norms appeared, in fact, to rise in salience with lower fertility, being relatively high for low-fertility countries (though this value was also relatively salient for Turkey). In the United States and West Germany, responses that "it's natural" to have children, that "that's what marriage is all about," and that having children "makes you an adult" or "makes you feel more adult" were

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[12] As I have observed elsewhere (Bulatao, 1975: 21), "This does not necessarily indicate that group pressure was unimportant: it may be that group demands were so internalized as to become identical with individual interests. Although the rhetoric of justification for childbearing may conceal collectivistic motivations, it is nevertheless predominantly individualistic."

TABLE 16 Indicators of the emergence of the conjugal family, by country and sex: 1975–76

Indicator	Philippines	Turkey	Indonesia	Thailand	Korea	Taiwan	Singapore	United States	West Germany
WIVES									
Percentage mentioning advantages									
Companionship, love	13	23	14	12	25	37	41	54	31
Happiness	49	0	19	8	47	0	69	0	49
Play, fun, distraction	19	22	9	2	1	69	15	49	0
Marital bond	10	15	9	4	17	11	21	32	28
Ratings of reasons for having children									
Not to be lonely	.11	.21	.05	–.03	.30	.26	.57	–.00	–.02
To be needed	–.09	–.43	–.16	–.03	.09	–.26	.14	.33	.35
To bring love	.20	.13	.09	.13	.18	.07	.16	.93	.82
Fun	.14	.16	.08	–.06	.21	.13	.24	.65	.89
To complete family	.10	.17	.07	.08	.32	.27	.56	.34	.24
Marital bond	.19	.17	.11	.06	.08	.04	.34	–.01	.26
Percentage mentioning marital strains among disadvantages	1	1	1	0	4	1	1	6	1
HUSBANDS									
Percentage mentioning advantages									
Companionship, love	13	12	10	5	22	22	25	41	na
Happiness	48	0	15	9	45	0	74	0	na
Play, fun, distraction	17	29	8	2	3	65	18	44	na
Marital bond	11	11	12	6	18	12	32	35	na
Ratings of reasons for having children									
Not to be lonely	.05	.07	–.02	–.07	.30	.29	.51	–.08	na
To be needed	–.10	–.36	–.11	–.05	.04	–.28	.13	.20	na
To bring love	.19	.10	.08	.07	.27	.12	.08	.92	na
Fun	.13	–.07	.06	–.09	.23	.15	.27	.67	na
To complete family	.13	.08	.03	.13	.28	.32	.65	.43	na
Marital bond	.21	.11	.10	.08	.15	.08	.40	.13	na
Percentage mentioning marital strains among disadvantages	1	3	1	0	8	1	1	7	na

na—not applicable to West German sample.

TABLE 17 Indicators of the emergence of the conjugal family, by region and sex: Philippines, 1975

Indicator	Bicol	Mindanao	East Visayas	Central Luzon	Cagayan	West Visayas	Central Visayas	Ilocos	Southern Tagalog	City of Manila
WIVES										
Percentage mentioning advantages										
Companionship, love	20	25	9	8	11	22	12	8	10	10
Happiness	49	57	71	47	56	57	41	55	41	61
Play, fun, distraction	17	22	12	16	15	15	24	10	23	20
Marital bond	8	14	6	5	15	7	5	3	14	20
Ratings of reasons for having children										
Not to be lonely	.08	.18	.11	.08	.20	.04	.10	.29	.11	.16
To be needed	−.18	−.08	−.05	−.13	−.04	−.12	−.17	−.09	−.04	−.11
To bring love	.18	.25	.34	.19	.19	.16	.19	.25	.18	.20
Fun	.18	.19	.28	.15	.23	.09	.17	.30	.05	.14
To complete family	.15	.08	.20	.08	−.02	.08	.10	.01	.14	.10
Marital bond	.15	.23	.20	.18	.20	.16	.26	.18	.18	.20
Percentage mentioning marital strains among disadvantages	1	2	1	1	1	3	1	1	2	2
HUSBANDS										
Percentage mentioning advantages										
Companionship, love	27	17	8	3	5	23	8	17	9	8
Happiness	44	72	61	58	45	55	33	58	39	33
Play, fun, distraction	3	14	39	21	14	17	28	8	11	50
Marital bond	6	24	8	5	27	4	6	17	10	50
Ratings of reasons for having children										
Not to be lonely	−.04	.06	.29	.16	.16	−.01	−.19	.33	.04	.17
To be needed	−.10	−.18	−.09	−.16	.07	−.11	−.19	.09	−.07	−.17
To bring love	.26	.24	.29	.21	.25	.05	.23	.17	.18	.42
Fun	.08	.24	.29	.19	.21	.10	.20	.25	.03	.25
To complete family	−.01	.17	−.02	.16	.07	.08	.23	.08	.16	.33
Marital bond	.23	.24	.21	.21	.16	.08	.34	.08	.22	.42
Percentage mentioning marital strains among disadvantages	0	11	0	0	0	0	0	0	2	0

TABLE 18 Indicators of the emergence of the conjugal family, by sample area and sex: Korea, 1976

Indicator	Hong-chon	Sosan	Naju	Jonju	Jinju	Chang-nyong	Seong-nam	Pusan	Daegu	Seoul
WIVES										
Percentage mentioning advantages										
Companionship, love	27	31	16	19	24	33	27	19	24	20
Happiness	43	41	43	56	38	57	56	42	54	49
Play, fun, distraction	0	1	3	2	2	1	3	1	4	1
Marital bond	4	20	16	14	11	17	19	19	19	17
Ratings of reasons for having children										
Not to be lonely	.43	.34	.09	.32	.29	.33	.36	.28	.28	.27
To be needed	−.01	.01	.14	.00	.04	.08	.10	.26	.15	.17
To bring love	.07	.15	.06	.23	.18	.00	.16	.41	.22	.26
Fun	.22	.21	.12	.25	.21	.10	.21	.18	.27	.26
To complete family	.30	.32	.29	.49	.34	.33	.21	.29	.40	.26
Marital bond	−.03	.08	−.01	−.02	.04	−.04	.17	.17	.21	.12
Percentage mentioning marital strains among disadvantages	0	4	1	11	2	2	5	7	4	4
HUSBANDS										
Percentage mentioning advantages										
Companionship, love	30	24	21	20	21	38	21	18	21	16
Happiness	37	34	35	55	35	54	60	36	31	58
Play, fun, distraction	0	5	6	0	7	0	6	0	10	2
Marital bond	7	16	23	30	10	5	21	14	18	23
Ratings of reasons for having children										
Not to be lonely	.39	.38	.05	.39	.19	.29	.35	.14	.30	.31
To be needed	−.06	−.00	.17	−.01	−.02	−.00	−.11	.14	.37	.04
To bring love	.05	.35	.02	.24	.22	.17	.25	.37	.19	.40
Fun	.25	.26	.02	.12	.25	.04	.33	.28	.17	.31
To complete family	.22	.30	.05	.37	.39	.34	.23	.29	.22	.30
Marital bond	.15	.05	.14	.07	.16	−.15	.25	.28	.27	.25
Percentage mentioning marital strains among disadvantages	4	9	9	17	4	3	8	5	5	7

TABLE 20 Indicators of cultural props for high fertility, by country and sex: 1975–76

Indicator	Philippines	Turkey	Indonesia	Thailand	Korea	Taiwan	Singapore	United States	West Germany
WIVES									
Percentage mentioning advantages									
Family name, line	7	8	36	4	19	37	21	6	5
Religious, social obligations	1	7	3	2	2	1	0	2	0
Adult status, social norms	1	14	0	0	5	5	3	14	18
Ratings of reasons for having children									
To continue family line	.02	.11	.13	.21	.46	.28	.22	−.28	−.46
To please relatives	−.16	−.23	−.02	−.11	.31	.04	.03	−.59	−.45
Religion	−.42	−.03	−.13	−.54	−1.18	−.59	−.81	−.57	−.57
Odd to be childless	−.03	.11	−.17	−.11	.09	.07	.06	−.34	−.04
To be a woman/man	−.07	.19	−.01	−.08	−.32	.20	.20	.04	.04
Percentage mentioning overpopulation among disadvantages	0	1	0	0	1	0	0	3	1
Percentage considering overpopulation a somewhat serious or very serious problem	74	37	40	81	86	87	88	62	na
Percentage[a] considering overpopulation a reason for themselves to have fewer children	63	54	23	54	71	66	48	43	30
HUSBANDS									
Percentage mentioning advantages									
Family name, line	12	15	53	13	25	49	26	11	na

more common. In Turkey, the emphasis was on the related idea that "most people expect married couples to have children."

Ratings of the importance of a similar set of five values also showed the absence of any consistent downward trend. There were in fact no monotonic trends in these ratings. For four of the values—particularly for continuing the family line and pleasing relatives, but also for becoming a woman or man (through having children) and the oddness of being childless—the ratings rose from high- to moderate-fertility countries, then fell sharply, to the lowest levels, for low-fertility countries. For pleasing relatives, for instance, the ratings were between −.23 and −.01 in the high-fertility countries, between .03 and .31 in the moderate-fertility countries, and between −.59 and −.45 in the low-fertility countries. For the fifth value, religion, ratings fell from high- to moderate-fertility countries, then rose slightly in low-fertility countries. Two other values that might properly fall in this group—to be remembered and to become a better person—declined in ratings, as was earlier shown.

Further disconfirmation of the prediction was provided in regional comparisons. For the Philippines, the family name fluctuated in salience on the open-ended question without definite pattern (Table 21). The other two values were too seldom mentioned for any clear patterns to appear. Adult status and social norms, however, were slightly more salient in Manila—contrary to predictions—than elsewhere. For Korea, the levels of salience of these three values were generally higher than in the Philippines, a finding that again was contrary to predictions (Table 22). A slight and inconsistent tendency for the family name to decline in salience at lower fertility levels was the only supportive finding. No trend appeared across Korean cities and counties on the other two values. Among the structured ratings, becoming a woman or a man was up slightly in ratings in the two lowest-fertility regions in the Philippines. Other values showed no convincing trends. In Korea, becoming a woman or a man moved slightly downward. Again there were no other solid trends.

Between high-parity nonlimiters and low-parity limiters, the few differences in the salience of these values among advantages of children were inconsistent with predictions (Table 23). In no case among wives was there a difference in regard to the family name. Among husbands, a large percentage difference in regard to the family name did appear in five cases, but in four of these the differences ran counter to predictions. On the adult status and social norms value, the only differences were in the United States and Turkey (among both wives and husbands) and in Taiwan (among husbands). In each of these cases, low-parity limiters considered this value more salient. There were large differences between the two groups in roughly half the comparisons of value ratings, but the differences were as likely to go one way as the other. Nor was it possible to identify individual values or individual countries that were more consistent than the others.

In no set of comparisons, therefore, did variations in perceived values attached to children agree with the cultural props explanation for the fertility transition. As Figure 6 illustrates, the family name did not decrease in salience and one of the values, adult status and social norms, in fact appeared to increase slightly in salience on the open-ended question with lower fertility. A rise in the salience and importance of some of these values at intermediate fertility levels and a subsequent decline are a possibility. However, cultural rather than developmental factors may have produced the observed patterns. These patterns, furthermore, do not support the prediction. It may be that parents conceal the cultural pressures for childbearing, either deliberately in order to avoid the appearance of being manipulated by others or unintentionally because these pressures are thoroughly internalized. To rescue the cultural explanation, one would have to further hypothesize differential rates of concealment of these values, and it is not easy to see what could account for these across fertility levels. It is possible also that the cultural explanation is more appropriate at a still earlier stage in the

FIGURE 6 Salience of family name and adult status, social norms by fertility level, after smoothing

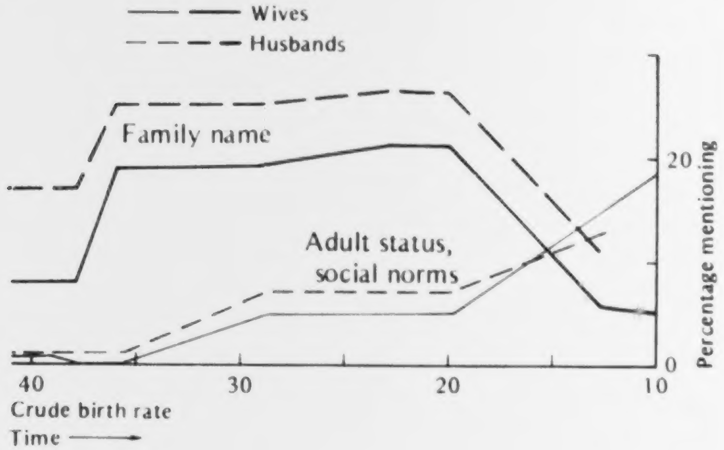

TABLE 23 Indicators of cultural props for high fertility among high-

	Philippines		Turkey		Indonesia	
Indicator	HPN	LPL	HPN	LPL	HPN	LPL
WIVES						
Percentage mentioning advantages						
Family name, line	9	10	6	13	35	38
Religious, social obligations	1	0	10	9	3	0
Adult status, social norms	1	0	6	21	0	0
Ratings of reasons for having children						
To continue family line	.02	−.00	.38	.13	.13	.18
To please relatives	−.14	−.08	−.17	−.40	−.03	.07
Religion	−.37	−.31	.23	−.38	−.15	−.23
Odd to be childless	.00	.04	.10	−.02	−.12	−.23
To be a woman/man	−.10	−.05	.16	.24	−.02	−.05
Percentage mentioning overpopulation among disadvantages	0	0	0	0	0	0
Percentage considering overpopulation a somewhat serious or very serious problem	71	84	21	67	36	46
Percentage considering overpopulation a reason for themselves to have fewer children	58	77	9	52	17	25
HUSBANDS						
Percentage mentioning advantages						
Family name, line	0	14	4	25	53	33
Religious, social obligations	0	7	55	23	1	6
Adult status, social norms	0	0	6	24	0	0
Ratings of reasons for having children						
To continue family line	.10	.05	.13	.37	.10	.12
To please relatives	−.07	−.15	−.09	−.50	−.03	−.16
Religion	−.49	−.48	.18	−.11	−.04	−.16
Odd to be childless	−.10	.05	.08	−.13	−.20	−.32
To be a woman/man	.00	−.02	.28	−.05	−.11	.01
Percentage mentioning overpopulation among disadvantages	0	0	0	0	0	0
Percentage considering overpopulation a somewhat serious or very serious problem	63	73	9	73	49	69
Percentage considering overpopulation a reason for themselves to have fewer children	55	56	9	64	22	48

parity nonlimiters and low-parity limiters, by country and sex: 1975–76

Thailand		Korea		Taiwan		Singapore		United States	
HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL	HPN	LPL
2	8	16	7	39	30	25	17	11	5
2	3	7	0	2	1	0	1	6	2
0	0	5	5	2	9	2	1	6	17
.09	.22	.53	.29	.27	.24	.24	.09	–.49	–.28
–.09	–.17	.24	.30	.02	–.03	–.13	.07	–.80	–.58
–.17	–.72	–1.24	–1.11	–.48	–.69	–.75	–.88	–.52	–.58
–.06	–.21	.15	.18	.09	.12	.13	.14	.04	–.28
–.07	–.12	–.37	–.29	.14	.27	.28	.16	.09	.01
0	0	0	0	0	0	0	0	0	3
87	83	71	91	81	93	86	92	36	75
49	52	58	72	49	77	24	53	12	55
3	17	10	20	45	42	23	18	0	9
7	4	0	5	0	4	6	0	0	4
0	1	0	9	0	12	0	1	0	14
.23	.32	.37	.16	.28	.20	.19	.13	–.44	–.18
–.11	–.24	.25	.06	.13	–.06	–.26	–.01	–.94	–.58
–.49	–.76	–1.33	–1.01	–.62	–.81	–.59	–.75	–.44	–.52
–.03	–.16	.15	.06	–.02	.12	.24	–.01	–.44	–.51
–.06	–.07	–.38	–.42	.23	.15	–.15	.06	–.32	–.38
0	0	0	7	0	0	0	0	0	4
71	75	90	99	53	92	88	91	57	61
40	59	85	91	29	71	44	53	46	42

Religious, social obligations	1	22	7	4	5	3	1	4	na
Adult status, social norms	1	17	1	1	7	7	5	12	na
Ratings of reasons for having children									
To continue family line	.11	.27	.13	.32	.39	.31	.32	−.12	na
To please relatives	−.21	−.18	−.01	−.10	.21	.03	.03	−.57	na
Religion	−.51	.05	−.07	−.68	−1.12	−.67	−.80	−.60	na
Odd to be childless	.00	.03	−.22	−.12	.06	.09	.03	−.44	na
To be a woman/man	−.06	.04	−.08	−.05	−.30	.17	.15	−.35	na
Percentage mentioning overpopulation among disadvantages	0	0	0	0	3	0	0	5	na
Percentage considering overpopulation a somewhat serious or very serious problem	71	48	55	76	89	88	88	60	na
Percentage[a] considering overpopulation a reason for themselves to have fewer children	60	35	32	53	72	68	55	43	na

na—not applicable to West German sample.

[a] Base for percentages includes those who considered overpopulation not to be a serious problem at all.

TABLE 21 Indicators of cultural props for high fertility, by region and sex: Philippines, 1975

Indicator	Bicol	Mindanao	East Visayas	Central Luzon	Cagayan	West Visayas	Central Visayas	Ilocos	Southern Tagalog	City of Manila
WIVES										
Percentage mentioning advantages										
Family name, line	9	15	3	4	9	5	12	14	4	16
Religious, social obligations	3	2	0	1	1	1	2	0	1	0
Adult status, social norms	1	2	0	1	0	0	1	0	1	4
Ratings of reasons for having children										
To continue family line	.06	−.12	.06	.03	−.17	−.01	−.05	−.06	.12	.08
To please relatives	−.08	−.49	−.14	−.09	−.41	−.05	−.43	−.33	−.05	−.15
Religion	−.40	−.54	−.36	−.41	−.43	−.48	−.33	−.51	−.38	−.60
Odd to be childless	−.21	.11	.18	−.17	−.05	.03	.12	−.36	−.03	.08
To be a woman/man	.03	−.30	−.21	−.03	−.22	−.12	−.27	−.27	.09	.14
Percentage mentioning overpopulation among disadvantages	0	2	1	0	0	0	0	3	0	0
Percentage considering overpopulation a somewhat serious or very serious problem	76	58	61	59	59	87	71	71	82	84
Percentage considering overpopulation a reason for themselves to have fewer children	67	50	51	48	41	78	66	53	66	76

HUSBANDS										
Percentage mentioning advantages										
Family name, line	23	14	0	8	18	12	14	17	9	17
Religious, social obligations	0	3	0	0	0	0	0	0	3	0
Adult status, social norms	3	0	0	0	0	4	0	0	0	8
Ratings of reasons for having children										
To continue fmaily line	.08	.03	.06	.16	.07	.10	.20	.08	.14	.08
To please relatives	−.10	−.28	−.25	−.21	−.50	−.16	−.55	−.36	−.09	−.08
Religion	−.54	−.56	−.48	−.66	−.55	−.50	−.44	−.82	−.41	−.75
Odd to be childless	−.21	.20	.06	−.21	.22	.05	.11	.00	−.03	.00
To be a woman/man	.02	−.28	−.25	−.16	−.36	.02	−.39	−.08	.11	.08
Percentage mentioning overpopulation among disadvantages	0	0	0	0	5	0	0	0	0	0
Percentage considering overpopulation a somewhat serious or very serious problem	64	52	62	65	64	71	61	58	83	100
Percentage considering overpopulation a reason for themselves to have fewer children	59	47	51	58	44	63	57	41	66	83

TABLE 22 Indicators of cultural props for high fertility, by sample area and sex: Korea, 1976

Indicator	Hong-chon	Sosan	Naju	Jonju	Jinju	Chang-nyong	Seong-nam	Pusan	Daegu	Seoul
WIVES										
Percentage mentioning advantages										
Family name, line	19	19	37	31	20	20	27	3	11	11
Religious, social obligations	2	2	4	2	6	2	5	2	1	2
Adult status, social norms	8	4	4	11	6	4	6	10	4	3
Ratings of reasons for having children										
To continue family line	.55	.43	.43	.50	.51	.53	.42	.37	.45	.42
To please relatives	.41	.32	.28	.27	.27	.31	.37	.30	.29	.31
Religion	−1.08	−1.12	−1.41	−1.18	−1.20	−1.19	−1.22	−1.03	−1.26	−1.16
Odd to be childless	.06	.16	.07	.10	.02	.03	.01	.09	.10	.15
To be a woman/man	−.42	−.35	−.33	−.51	−.28	−.35	−.25	−.26	−.31	−.25
Percentage mentioning overpopulation among disadvantages	0	0	3	2	2	1	1	0	1	0
Percentage considering overpopulation a somewhat serious or very serious problem	80	86	90	78	89	71	90	92	88	93
Percentage considering overpopulation a reason for themselves to have fewer children	63	73	68	62	69	61	78	73	66	79

HUSBANDS										
Percentage mentioning advantages										
Family name, line	26	32	50	37	21	16	17	5	33	17
Religious, social obligations	0	5	15	7	7	5	2	9	5	3
Adult status, social norms	7	9	6	15	0	11	10	9	5	4
Ratings of reasons for having children										
To continue family line	.36	.36	.49	.57	.40	.34	.31	.39	.35	.39
To please relatives	.25	.09	.34	.12	.25	.22	.25	.23	.23	.25
Religion	−1.16	−1.04	−1.35	−1.09	−1.06	−1.25	−1.21	−1.04	−1.27	−1.03
Odd to be childless	.25	.13	.08	−.01	.01	−.03	.19	.06	−.06	.03
To be a woman/man	−.33	−.38	−.26	−.52	−.27	−.50	−.17	−.17	−.19	−.22
Percentage mentioning overpopulation among disadvantages	0	5	6	5	0	5	2	0	3	2
Percentage considering overpopulation a somewhat serious or very serious problem	97	92	77	87	83	73	94	100	85	94
Percentage considering overpopulation a reason for themselves having fewer children	80	71	61	60	76	61	82	82	60	82

transition–i.e., for tribal rather than peasant societies. This hypothesis cannot be tested with the current samples.

Overpopulation. Prediction C7, that concern with overpopulation relates to lower fertility, also follows from the weakening cultural props factor, though I argued earlier that this prediction was not essential to the factor. Overpopulation was very low in salience on the open-ended question. In the U.S. sample, 3 percent of wives and 5 percent of husbands mentioned overpopulation, and the percentages dropped off from there. None of the comparisons–across countries, across Philippine and Korean sample areas, between nonlimiters and limiters–provided sufficient contrasts to support this prediction (Tables 20 to 23).

On structured questions, more variation could be observed. Concern with overpopulation, like financial costs, seemed to peak in moderate-fertility countries, then decline in low-fertility countries. Within countries no firm trend could be established: in the Philippines concern with this problem did not consistently increase at lower fertility levels, and in Korea there was only a slight increase in the number who said they took overpopulation into account in childbearing. Between nonlimiters and limiters, however, the contrasts were clear and consistent. Limiters more often considered overpopulation a serious problem and more often judged it a reason for having fewer children themselves. Why these contrasts appeared whereas other contrasts did not is not clear.

The variations in the values and disvalues related to the cultural props explanation may mirror cultural norms and practices rather than socioeconomic development or fertility levels. Concern with the family line, for instance, appeared to be high in the more patriarchal societies regardless of development level. Concern about overpopulation appeared to reflect official birth control programs and family planning propaganda rather than development level. The data do not deny that the weakening of cultural props for high fertility may be a factor in the fertility transition in a particular country where these props are initially strong. However, weakening cultural props do not seem, from the evidence of these value measures, to be an essential part of the fertility transition as a universal process.

Mortality reduction

Only tangential evidence regarding Prediction D1, that mortality reduction should make the achievement of security through many children a less prominent value, appeared among the open-ended responses.

One disvalue, worry over children's sickness, may be relevant to mortality reduction. This disvalue did appear to decline in salience across countries, as earlier observed (see Table 12). This disvalue aside, mortality reduction was alone among the predictions in not being reflected among advantages or disadvantages of children. This finding may have been largely due to the way the questions were phrased, contrasting children and no children rather than different numbers of children.

Some evidence regarding Prediction D1 is available from a separate question. Each respondent was asked what she or he thought of having an only child and what was the basis for that evaluation. The responses were open-ended, and occasionally vague, such as not wanting an only child because it is "not good for the parents." Those who specifically mentioned that an only child might die, that if he died there would be no one to replace him, or that they would be more secure with more children are shown in Table 24. The frequency of such explicit references to mortality risks varied considerably across countries, being highest (between 27 and 41 percent) in Turkey and Thailand, lower in the other high-fertility countries, and (except for Taiwan) zero in the moderate and low-fertility countries. Across regions in the Philippines (Table 25) concern with mortality rose slightly rather than falling. No comparisons were possible within the Korean sample because no one explicitly mentioned mortality risks. Across individuals the differences were not consistent (Table 24). In Thailand it was the limiters among both wives and husbands who mentioned mortality risks more often, as was also true with husbands in Turkey, but among husbands in Taiwan it was the nonlimiters who mentioned such risks more often. There is thus some indication that, at moderate and low fertility levels across countries, children beyond the first were less useful for providing insurance against mortality, but within countries the same prediction was not generally supported.

Correlations

A statistical summary of the findings is provided in Tables 26 and 27 in the form of correlations, across countries and across sample areas for the Philippines and Korea, between fertility rates and the frequency with which each value and disvalue was mentioned on the advantages or disadvantages question. The tables also give mean percentage differences across countries between high-parity nonlimiters and low-parity limiters in frequency of mentioning each value and disvalue. Because the structured measures are more varied, these tables do not include them. The tables have to be treated with caution. Particularly for seldom mentioned values, large correlations can be produced by a single or a couple of high percentages. For values that vary only slightly in salience, a small change can produce a sizable correlation. Moreover, as observed earlier, some values did not increase or decrease in salience linearly, showing greater change at one or the other end of the fertility continuum. These caveats aside, the tables do provide some objective measure of the trends that have been discussed.

Table 26 confirms the greater salience of economic benefits from children at higher fertility levels (or lower salience at lower fertility levels) and the inconsistent trends in social benefit values. It also confirms the increase in salience of enhanced marital bond through children and, to some extent, of companionship with children at lower fertility levels, plus slight similar trends in some psychological appreciation values. Table 27, on the disadvantages of children, confirms that perceived child costs did not increase, and, in some cases, actually decreased with lower fertility; that childrearing demands changed with lower fertility, though not necessarily upward or downward in the aggregate; and that restrictions on parents increased with lower fertility. In the correlations across countries, it makes little difference whether 1975, 1976, or 1977 crude birth rates are used, since these are all highly correlated. A more refined rate, the 1973 gross reproduction rate, also gives similar results.

The last two columns of each table present correlations across countries with 1976 per capita GNP. Since per capita GNP and fertility are highly related in this sample, the last two columns resemble the first two in each table except for sign. Where the correlations vary slightly, what is mainly reflected is the somewhat anomalous position of Turkey. The values and disvalues for the Turkey sample seemed to imply lower fertility than actual rates. The pattern of responses was generally closer to the moderate-fertility than to the high-fertility countries, with which Turkey formally belongs. As noted earlier, this sample also had more limiters and fewer nonlimiters than expected. Turkey's per capita GNP in 1976 was more than double that of any of the other high-fertility countries, above Korea's and close to Taiwan's, which suggests a possible explanation for this pattern.[13]

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[13] A recent study of fertility decline in 94 developing countries (Mauldin and Berelson, 1978) confirms that Turkey is a special case. It was one of only two countries with substantially greater decline than expected from measures of modernization and family planning program effort.

SUMMARY AND CONCLUSION

Data from both open-ended and structured questions on values and disvalues attached to children provided clear and unequivocal support for one of the five demand-related explanatory factors for the fertility transition, sharp disconfirmation for another of the factors, and ambiguous or conflicting results for the other three factors. The economic factor, vanishing economic roles for children, was supported by the expected variations in perceived economic benefits from children, and these perceptions were clearly tied to fertility intentions. On the other hand, the cultural factor, weakening cultural props for high fertility, was not supported. Other studies on the value of children have indicated that, in both traditional and modern settings, social pressures to have children are seldom mentioned and are given little importance (Arnold and others, 1975; Bulatao, 1975). There is nothing here to contradict that finding.

The demographic factor, mortality reduction, found support from the perceived disadvantages of having an only child. Concern with insurance against child mortality did not appear among the general advantages of children, however, nor did it relate to fertility intentions, thus leaving some doubt about the importance of this factor.

The social factor, the emergence of the conjugal family, was related in the prediction set to one cluster of values and three clusters of disvalues. The prediction relating to values was supported, but the predictions relating to disvalues were not. Children's companionship and reinforcement of the marital bond did become more salient at low fertility levels, and were related to small-family intentions in low-fertility areas. But the increases in marital strain, in childrearing demands, and in perceived financial costs that were predicted to accompany the value changes did not appear. The closest thing to the predicted increases in disvalues was a somewhat greater emphasis on the emotional strain of childrearing at moderate and low fertility levels. I had assumed earlier that the increase in some values attached to children as a result of the spread of the conjugal family would be more than offset by increasing disvalues. Since this was not the case, could there be some other way the emergence of the conjugal family contributes to fertility decline, independently of the other factors? One possibility would be that values involving closeness to children and spouse may be adequately attained only with small families. There may be other possibilities, but since this is only speculation it might be left for further research.

The psychological factor, higher aspirations, similarly had its share of successes and failures. As predicted, some of the psychological appreciation values were higher in salience and importance at low fertility levels. Contrary to predictions, however, the financial costs of children and childrearing demands did not rise as fertility fell.

Financial costs were a factor in individual fertility intentions, but may have been counterbalanced by higher incomes and did not appear to be a factor in areal and country comparisons. Again as predicted, perceived restrictions on parents were higher at low fertility levels and related systematically to fertility intentions. Two aspects of the aspirations factor were earlier distinguished: aspirations the parent has for herself or himself (the "time cost" aspect) and aspirations for the children. The positive evidence relates entirely to the former, the negative evidence to the latter. The aspirations factor therefore splits neatly in half, half supported and half contradicted by the data.[14]

Few of the trends in values and disvalues examined in relation to these factors were linear across fertility levels. There seemed to be not one but two value-of-children transitions, the first between high and moderate fertility levels and the second between moderate and low fertility levels. Table 28 attempts to summarize the values and disvalues that were observed to distinguish each stage.

The assumption is that the secular transformation of values is not a smooth process, and that particular changes are important at particular points in the fertility transition. This assumption helps account for some apparent contradictions between country, regional, and individual comparisons. For instance, restrictions on parents increased across countries but not across Philippine or Korean sample areas, and they also failed to distinguish limiters and nonlimiters, except in the

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[14] Although this study was not specifically designed to test Caldwell's (1977) restatement of demographic transition theory, it is worth noting the several positive as well as negative implications for his theory. Economic benefits did decline, as he would have predicted, but economic costs did not rise, contrary to his expectations. The decline in benefits was gradual, and related at each stage to lower fertility. There was no indication of Caldwell's "great divide," that point where the direction of the wealth flow changes and the transition supposedly takes place. The emotional nucleation of the family did appear in the data, but its link to the wealth flow was not established. Economic benefits appeared to decline before the values related to family nucleation increased. Other social and psychological reasons for childbearing, which Caldwell demoted to second-level determinants, in fact appeared to be at least equally important, particularly the factor of personal aspirations. There are, therefore, elements of perceptiveness in Caldwell's formulation, but the organization of the elements is not persuasive.

TABLE 28 Observed changes in values and disvalues attached to children

Explanatory factor	Transition from high to moderate fertility levels	Transition from moderate to low fertility levels
Vanishing economic roles for children	Financial, practical help declines	Financial, practical help declines
	Help in housework declines	Help in old age declines
Rising aspirations		Being tied down rises
		Fulfillment rises
		Achievement, power rises
	Cost of education declines (contrary to prediction)	
	Emotional strain rises	Discipline declines
Emergence of the conjugal family	Cost of education declines (contrary to prediction)	
	Emotional strain rises	Discipline declines
	Companionship, love rises (less sharply)	Companionship, love rises (more sharply)
	Fun rises (less sharply)	Fun rises (more sharply)
	Marital bond rises (less sharply)	Marital bond rises (more sharply)
Weakening cultural props for high fertility		Adult status, social norms rises (slightly, contrary to prediction)
Mortality reduction	Insurance against mortality declines	

low-fertility country. The failure of these disvalues to relate to fertility levels within countries at earlier stages of the transition is understandable if these disvalues do not increase in prominence until late in the transition. Similarly, rewarding interactions values rose across countries, but, in the low-fertility country, were linked with higher rather than lower individual fertility. If interest in interaction rewards reaches a plateau at a relatively high level late in the transition, as this interest ceases to increase it could become linked with having more rather than having fewer children. The economic benefit values provide a more in-

TABLE 24 Percentage who considered an only child undesirable because of mortality risks, among all respondents and among high-parity nonlimiters and low-parity limiters, by country and sex: 1975–76

Sex and type of respondents	Philippines	Turkey	Indonesia	Thailand	Korea	Taiwan	Singapore	United States
WIVES								
All wives	17	41	12	33	0	8	0	0
High-parity nonlimiters	23	41	13	29	0	5	0	0
Low-parity limiters	15	35	15	42	0	3	0	0
HUSBANDS								
All husbands	16	27	12	31	0	12	0	0
High-parity nonlimiters	10	7	12	21	0	15	0	0
Low-parity limiters	14	23	6	35	0	2	0	0

NOTE: Base for percentages includes those who considered an only child desirable.

TABLE 25 Percentage who considered an only child undesirable because of mortality risks, by sex and region: Philippines, 1975

Sex	Bicol	Min-danao	East Visayas	Central Luzon	Cagayan	West Visayas	Central Visayas	Ilocos	Southern Tagalog	City of Manila
All wives	14	15	12	19	24	17	16	25	15	25
All husbands	13	11	15	8	9	25	22	9	17	17

TABLE 26 Association between fertility level and perceived advantages of children: summary measures, by sex, 1975–76

	Correlation across countries with 1976 crude birth rate		Correlation across regions with 1968 TFR, Philippines		Correlation across sample areas with 1974 TFR, Korea		Mean percentage difference across countries, HPN–LPL		Correlation across countries with 1976 per capita GNP[a]	
Advantage	Wives[b]	Husbands	Wives	Husbands	Wives	Husbands	Wives	Husbands	Wives	Husbands
Instrumental assistance										
Help in housework	.73	.70	.68	.47	.64	.58	8.3	4.9	−.51	−.39
Help in old age	.75	.70	−.59	.06	.74	.75	11.6	11.7	−.75	−.70
Financial, practical help	.87	.84	.56	.39	−.03	.29	8.0	6.1	−.78	−.68
Family name, line	.07	−.04	−.42	−.08	.54	.40	1.9	−5.0	−.42	−.35
Religious, social obligations	.56	.40	.58	.08	.20	−.04	1.9	2.0	−.31	−.15
Adult status, social norms	−.60	−.29	−.61	−.14	.16	.19	−3.9	−6.9	.76	.43
Rewarding interactions										
Companionship, love	−.81	−.90	.47	.37	.35	.51	−7.0	6.3	.73	.88
Happiness	−.19	−.06	.00	.58	−.34	−.24	−6.7	−7.0	.03	−.17
Play, fun, distraction	−.23	−.53	−.24	−.60	−.35	−.17	−3.4	−6.7	.15	.42
Marital bond	−.82	−.84	−.45	−.66	−.56	−.30	−7.9	−9.3	.92	.84
Psychological appreciation										
Living through children	−.37	−.37	−.03	.08	.07	−.56	−.1	−.7	.61	.54
Achievement, power	−.45	−.49	.20	.36	.37	.10	1.1	−2.0	.57	.60
Character, responsibility	−.69	−.36	.22	−.69	−.50	−.30	−.7	−1.3	.80	.12
Incentive to succeed	.24	.00	.66	−.12	−.14	.30	−1.7	1.1	−.42	.19
Fulfillment	−.82	−.68	−.54	.03	−.13	−.45	−2.9	−4.5	.97	.90
Insurance against mortality[c]	.71	.72	−.60	−.27	[d]	[d]	.1	−1.9	−.44	−.52

NOTE: The .05 level of significance (one-tailed) is reached for all these correlations somewhere between .51 and .56 or −.51 and −.56.

a Source of GNP data: Population Reference Bureau (1976).

b West Germany was included in calculations for this column, except for the last row, but excluded everywhere else.

c From the separate question on an only child.

d Cannot be computed because this value was not mentioned by respondents.

TABLE 27 Association between fertility level and perceived disadvantages of children: summary measures, by sex, 1975–76

Disadvantage	Correlation across countries with 1976 crude birth rate		Correlation across regions with 1968 TFR, Philippines		Correlation across sample areas with 1974 TFR, Korea		Mean percentage difference across countries, HPN–LPL		Correlation across countries with 1976 per capita GNP	
	Wives[a]	Husbands	Wives	Husbands	Wives	Husbands	Wives	Husbands	Wives	Husbands
Financial costs										
Cost of education	.79	.80	.09	−.44	.73	.53	2.0	2.9	−.56	−.39
Other financial costs	.16	−.16	.17	.09	.54	.80	4.9	18.9	−.09	.17
Childrearing demands										
More work	.03	−.05	.34	.63	−.38	[b]	−1.3	.5	−.19	−.18
Emotional strain	−.46	−.59	.49	.58	.15	−.18	−1.0	−1.1	.10	.14
Health, pregnancy	.61	.42	.40	.29	−.75	−.44	0.0	−1.1	−.29	.10
Discipline	.51	.37	−.10	−.44	.57	.63	−2.5	−2.4	−.52	−.36
Child's sickness	.55	.49	.39	.01	.12	.18	−3.1	−7.6	−.44	−.33
Worry over child's future	.18	−.01	−.34	.53	.29	.44	−1.5	−1.0	−.11	.18
Other childrearing problems	.23	.51	−.11	.67	.14	.23	1.1	2.5	−.11	−.37
Restrictions on parents										
Tied down	−.88	−.76	.22	−.68	−.17	−.08	−13.6	−8.0	.96	.97
Can't work	−.71	.34	.37	.19	.09	.09	−3.3	−2.3	.80	−.15
Costs to social relationships										
Marital strains	−.50	−.44	−.25	.25	−.36	.10	−1.1	−2.6	.64	.58
Overpopulation	−.49	−.60	.09	.12	.15	.17	−.4	−1.4	.76	.78

NOTE: The .05 level of significance (one-tailed) is reached for all these correlations somewhere between .51 and .56 or −.51 and −.56.

[a] West Germany was included in calculations for this column, but excluded everywhere else.

[b] Cannot be computed because this value was not mentioned by respondents.

tricate illustration: specific values are differentiating only at specific levels, in accordance with the pattern shown in Table 28.

The pattern of changes indicates that the mortality reduction factor operates in the early transition, the vanishing economic roles factor in both early and late transition, the conjugal family factor to a slight extent in the early and to a greater extent in the late transition, and the aspirations factor predominantly in the late transition. It bears emphasizing that two other factors in the fertility transition–increased contraceptive availability and delayed marriage–should also be operative, but they are not represented in Table 28 because they are not demand factors and have no direct implications for values and disvalues attached to children.

The changes in positive values indicated are all monotonic though not necessarily linear. Disvalues may be different. Perceived financial costs and childrearing demands seem to rise for moderate-fertility countries and then fall off slightly for low-fertility countries. This finding suggests the possibility that, at intermediate levels, a perceived costs-of-children squeeze takes place that wrings out some of the "extra" children. When, over the long run, conditions for couples improve, the lost children are not made up, perhaps because other values and disvalues have come into play.

Regarding disvalues, too, there were two cases where individual comparisons produced differences but country comparisons did not. Perceived financial costs was one case, where nonlimiter-limiter comparisons indicated some link to fertility but country comparisons did not (other than the hypothetical intermediate squeeze just mentioned). Concern with overpopulation was another case: limiters were more concerned than nonlimiters, but this concern was no stronger in low- than in high-fertility countries. The disjunctions suggest that these social and economic concerns–and possibly others–may be relatively "permanent" concomitants of lower fertility that exert similar, basically unchanging influence under each fertility regime.

It is entirely possible that, with the small number of countries covered, what I have interpreted as high-to-moderate and moderate-to-low patterns in fact originate in cultural or other national differences unrelated to stage in the fertility transition. Different sequences may be possible for different countries with distinctive histories and cultures. Since the focus has been on comparisons, individual factors may have been missed that contribute to the transition in specific countries or cultural groups, though not generally. The interpretations that have been made are limited by the countries that have been considered. A different pattern for the value-of-children transition or transitions could conceivably have been obtained with a different set of countries. It would be worth investigating a different set, and, even more, collecting longitudinal data on several countries to avoid confounding cultural contrasts. If such data confirm the conclusions in this paper, it would be worth investigating next how transitions in the values and disvalues of children are produced, and what specific mechanisms link the changing values and disvalues to fertility intentions and behavior. It has not been the aim of this paper to answer these questions, but merely to attempt to implicate values and disvalues of children in the fertility transition.

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Further evidence of the transition in the value of children

Rodolfo A. Bulatao

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CURRENT STUDIES ON THE VALUE OF CHILDREN is a subseries of **PAPERS OF THE EAST-WEST POPULATION INSTITUTE.** It presents analyses of data from the Value of Children project, a cross-national study of parents' perceptions of the satisfactions and costs of children, and findings from similar studies. A description of the project may be found in the Editor's Foreword of Paper 60-A, *On the Nature of the Transition in the Value of Children.*

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The data used in Appendix C were collected in the second phase of the Value of Children project in collaboration with investigators Fred Arnold, Chalio Buripakdi, Peter S.J. Chen, Betty Jamie Chung, Russell K. Darroch, Nibhon Debavalya, James T. Fawcett, Lois W. Hoffman, Cigdem Kagitcibasi, Eddie Kuo, Sung Jin Lee, Visid Prachuabmoh, Masri Singarimbun, Tom T.H. Sun, and Tsong-Shien Wu. The German data were provided through Esther R. Mechler, Brian R. Flay, and Andrejs Urdze. Support for the project was provided by the International Development Research Centre, the Ford Foundation, the Rockefeller Foundation, the Smithsonian Institution, the Research Institute for the Study of Man, the U.S. National Institute of Child Health and Human Development, and the East-West Population Institute.

ABSTRACT The transition in the value of children consists of changes in parents' perceptions of specific values and disvalues attached to children that accompany the secular decline in fertility rates. To supplement the evidence from nine countries on this transition reported in a previous paper, data from a variety of sources on an additional 14 countries are considered. The new data reinforce the previous findings. This paper argues that the transition in the value of children can be seen as a dual process of liberation. First, children are liberated from having to contribute their labor to their families; then, parents are liberated from the burden of caring for many children.

The modern transition from high to low fertility rates means that successive generations of parents have fewer and fewer children. Why this happens is one of the most intensely researched questions in population studies. This paper argues that a central reason for the decline is a set of changes in the values and disvalues that parents attach to children. In some sense children become less valuable, but they also become valued for different reasons and the burdens they impose on their parents are altered not just quantitatively but also qualitatively.

These changes have been collectively labeled the transition in the value of children. The first section of this paper briefly reviews the character of this transition, the arguments for it, and the evidence that has been provided elsewhere (Bulatao, 1979). The burden of the paper, however, is not to expand on the theory but to attempt to confirm its elements, drawing on a fresh sample of studies. The previously presented evidence was limited to the seven Asian countries and two Western countries that had been included in the Value of Children (VOC) project. Consistent differences across countries on many measures of values and disvalues were observed. For some, this evidence may be reasonably convincing. For others, doubts may persist about the evidence, among other reasons because of the small number of countries selected. This paper is directed toward the latter group of readers and attempts to assuage some of the doubts.

The new evidence to be presented is from a miscellany of surveys in a more varied assortment of countries in Africa, Latin America, Europe, Asia, and Oceania. Cross-national comparisons will be made among values and disvalues attached to children. A number of methodological adjustments will be shown to improve the comparability of the data and facilitate interpretation. Properly handled, the disparate data sources are shown to lead to conclusions that are surprising only in one sense: that there are so few surprises, that the essential elements in the theory of the transition in the value of children appear confirmed. A brief restatement of the theory, therefore, closes the paper.

THEORY

The theory of the transition in the value of children, as presented in a previous paper (Bulatao, 1979) on which this section is based, involves individual fertility motivations but is not a theory of individual fertility. It attempts to explain, rather, the long-term change in fertility levels that accompanies modernization. Factors that explain this secular fertility decline may or may not be identical to factors that explain individual differences in fertility within a society.

The theory arose from an analysis of previous studies on the demographic transition. Various explanations of secular fertility decline are offered, often in unsystematic fashion, in this literature. An attempt was made to organize the explanations, and it was promptly discovered that the majority of the explanations involved changes in values and disvalues attached to children.

Seven basic explanations of secular fertility decline were distinguished in the previous paper: (1) fertility decline results from increased contraceptive availability and efficiency; (2) delayed marriage causes fertility decline; (3) mortality reduction leads to fertility decline; (4) as people's aspirations rise, fertility decline takes place; (5) fertility decline is the result of vanishing economic roles for children; (6) the emergence of the conjugal family and the values and social relations connected with this family type produce fertility decline; and (7) as cultural props for high fertility weaken, fertility declines. Each explanation has at least some adherents, though many writers mix together several explanations. These factors are not, of course, mutually exclusive. Several of them may be part of a complete explanation.

The first two of these explanations, involving changes in family-limitation costs and in the supply of children, do not directly affect the values parents hold regarding children. One does not expect them to be reflected in value-of-children data.[1] The latter five explanations do, however, involve changes in the demand for children, or in values and disvalues. Assuming each of these explanations is valid, one can predict specific differences between the values and disvalues attached to children under different fertility regimes (Table 1). These predictions about value and disvalue contrasts were tested through cross-sectional comparisons in the same paper. It was assumed that societies go through essentially similar changes in the values and disvalues attached to children, although precise trends in fertility rates may differ, and that their current fertility levels represent the stage they have reached in this process. Cross-sectional comparisons of fertility regimes, therefore, were taken as a substitute for the more appropriate longitudinal comparisons.

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[1] Some indirect effect, such as a change in motivations resulting from a change in actual childbearing behavior, cannot be ruled out. It is not possible to predict, however, which values or disvalues might be affected in this indirect manner.

The countries compared were four high fertility countries (the Philippines, Turkey, Indonesia, and Thailand), three moderate fertility countries (South Korea, Taiwan, and Singapore), and two low fertility countries (the United States of America and West Germany). The data used were perceived advantages and disadvantages of having children, ratings of values and disvalues, and responses to related questions by wives and husbands interviewed between 1975 and 1977, using similar questionnaires in each country. Roughly 1,000 to 3,000 wives and a quarter to a half of their husbands were sampled in each country, except in West Germany, where only 300 wives were interviewed. These samples were designed to be nationally representative, except again in West Germany and in Indonesia, where only two ethnic groups on the island of Java, Javanese and Sundanese, were interviewed. Besides comparisons among countries, comparisons were also made among regions in the Philippines, among cities and counties in Korea, and between high-parity respondents who were not limiting their families and low-parity respondents who were limiting their families in each country.

From these comparisons, I drew conclusions about trends in values and disvalues and the consequent validity of each explanation. I discovered that, in accordance with the vanishing economic roles explanation, the economic help children provide declined in salience and in centrality[2] from high to low fertility countries. Consistent with the rising aspirations explanation was the finding that the restrictions children impose on parents were increasingly salient and central at lower fertility levels. These two trends across countries were the strongest and most consistent identified. Two further trends were noted. Also consistent with the rising aspirations explanation was a slight increase in the salience and centrality of psychological appreciation values (children to provide fulfillment, to satisfy achievement and power needs, etc.). Consistent with the emergence of the conjugal family explanation was an increase in salience and centrality for companionship values and for children enhancing the marital bond. There were also disconfirmatory findings. Perceptions of the financial costs of children and of childrearing demands showed no rise, a finding partly contradicting both the rising aspirations and the conjugal family emergence explanations. Status-related, social, and religious values attached to children showed no decline, contradicting the cultural props explanation. Little data was available to support the mortality reduction explanation. Within-country comparisons were generally consistent with these conclusions. There was, finally, some indication that particular value and disvalue differences were greater between high and moderate fertility countries and that others were greater between moderate and low fertility countries. The early fertility transition appeared to be characterized by a decline in some types of economic assistance from children, the late transition by declines in other types of assistance (principally help in old age), combined with a greater emphasis on parents' personal aspirations and on the conjugal family. Table 2 reproduces the trends observed in the values and disvalues attached to children, which constitute what I am referring to as the theory of the value-of-children transition.

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[2] Salience and centrality, as two dimensions of value importance, are distinguished in Bulatao (1975:81–84). The former refers to the readiness with which values are verbalized, the latter to their rank in personal value hierarchies.

This picture of the transition was based on data from only the nine countries studied in the second phase of the Value of Children project. When a broader range of countries is considered, do the conclusions still hold? In attempting to answer this question, I shall not simply reexamine the value trends in Table 2, but actually reevaluate all the predictions in Table 1, including those that were not borne out with the nine countries.

DATA AND PROCEDURES

From assorted sources, survey data for 14 countries have been marshalled for this paper. Data from three other countries were considered and rejected, for reasons explained below. As in the previous paper (Bulatao, 1979), value measures will be compared across countries, cross-sectionally rather than longitudinally. The assumption must be made again, therefore, that each country is going through the same basic transition process, regardless of the stage it has currently attained. A customary interpretation of cross-sectional results is that they involve long-run comparisons as opposed to the short-run adjustments

TABLE 2 Observed changes in values and disvalues attached to children across nine countries in the Value of Children project

Explanatory factor	Transition from high to moderate fertility levels	Transition from moderate to low fertility levels
Vanishing economic roles for children	Financial, practical help declines	Financial, practical help declines
	Help in housework declines	Help in old age declines
Rising aspirations		Being tied down rises
		Fulfillment rises
		Achievement, power rises
	Cost of education declines (contrary to prediction)	
	Emotional strain rises	Discipline declines
Emergence of the conjugal family	Cost of education declines (contrary to prediction)	
	Emotional strain rises	Discipline declines
	Companionship, love rises (less sharply)	Companionship, love rises (more sharply)
	Fun rises (less sharply)	Fun rises (more sharply)
	Marital bond rises (less sharply)	Marital bond rises (more sharply)
Weakening cultural props for high fertility		Adult status, social norms rises (slightly, contrary to prediction)
Mortality reduction	Insurance against mortality declines	

NOTE: The nine countries in the Value of Children project are: the Philippines, Turkey, Indonesia, Thailand, South Korea, Taiwan, Singapore, the United States, and West Germany.

SOURCE: Bulatao (1979:95).

reflected in time-series results (e.g., Chenery and Syrquin, 1975). This interpretation also relies on the assumption of a uniform process.

Each survey contained at least one question about the advantages or disadvantages of having children. The discussion below focuses entirely on responses to these questions. The previous paper also considered a number of other measures of values and disvalues; none of these other measures was available for the majority of the surveys to be considered. Although a broader range of countries is discussed here, therefore, the substance of the investigation is narrowed to one type of measure reflecting the salience of values and disvalues.

The following section describes the surveys and samples used. Then attention is paid to the ways in which the data were massaged to get them into proper shape for comparison. The reader who is not interested in methodological details might skip lightly over these sections. They do indicate the diversity of the data sources, however—which makes comparisons more difficult but increases confidence in the generalizability of the findings. They also provide a few insights about the phrasing of questions on the value of children and explain why the statistics here may differ from other published figures.

Surveys, samples, countries

The surveys were conducted between 1963 and 1978 by about a score of investigators, most working independently. Some surveys were explicitly about the value of children, but others were general fertility surveys. The surveys fall into two distinct sets. Set A includes surveys very similar to those in the Value of Children (VOC) project, with which comparisons of specific value categories can be made. Set B includes surveys that were less similar, permitting only broad comparisons. The surveys in each set will now be described.

In Set A, one survey, that for Japan, was in fact part of the first phase of the VOC project. This phase covered small, selected samples rather than national samples, but used essentially the same methodology. All the countries studied in the first phase were also included in the second phase and have been previously discussed,[3] with the exception of Japan. The Japanese survey was conducted in 1972–73 by Iritani (1979). The other surveys in Set A all followed the approach and partially replicated the methodology of the first phase of the VOC project. These surveys were: a large national survey in the Netherlands conducted in 1975 and reported by Niphuis-Nell (1976); a similar survey in 1975–76 in Dutch-speaking Belgium reported by Deven (1977a, 1977b); a two-part Indian study conducted around 1976 by Khan (1977); a 1977 survey in Sydney, Australia, conducted by Callan (1979); and a 1978 study in West Malaysia by Kee Poo-kong for which no report has been completed so far.

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[3] The data from the other first-phase surveys were quite similar to the second-phase data. Comparisons between the advantages and disadvantages cited in the first-phase and in the second-phase surveys indicated that: (1) most results were equivalent, if one took into account the urban bias of most first-phase samples; (2) the measures were insufficiently precise and the samples too poorly matched to establish changes between 1972–73, when the first-phase surveys were conducted, and 1975–76, when the second-phase surveys were conducted; and (3) in the only important difference, the second-phase data for Thailand appeared to indicate a lower level of response, across the board, to both the advantages and disadvantages questions, in comparison with the first-phase results (and also in comparison with second-phase results for other countries), possibly as a result of more limited probing.

Three of these surveys had samples between 4,000 and 6,000, but the other three were smaller, with samples of 400 to 700. The largest sample was that for the Belgian survey, which included 4,877 women between ages 16 and 44, both married and single, and 690 husbands. The Dutch survey covered 4,522 currently married women. The Indian study actually covered two samples, an urban sample of 4,000 male industrial workers in four cities and a rural sample of 613 female and 784 male ever-married villagers from six states. The Indian rural sample was the only one in this set for which male and female data were not reported separately. Among the smaller surveys, the Australian sample was 717 married men and women in Sydney who were either migrants or nonmigrants–412 born in Greece or in Italy against 305 born in Australia–and who were further classified into three roughly equal occupational groups (professional, skilled, and unskilled). The West Malaysian sample was about 260 wives and their husbands, 57 percent from plantations and the rest urban. The Japanese sample was the smallest, being 211 wives and 201 of their husbands, distributed between urban and rural areas roughly in proportion to population.

The Set A surveys thus appear quite heterogeneous, but the surveys in Set B were even more diverse. Set B included surveys in four African countries (Nigeria, Ghana, Kenya, and Sierra Leone), five Latin American countries (Mexico, Peru, Colombia, Costa Rica, and Chile), and two Asian countries (Bangladesh and Iran). The largest of the African studies was a 1969 survey of 5,952 wives and mothers in Sierra Leone (Dow, 1971a, 1971b). There were three studies for Nigeria. The first was of moderate size, a 1973 survey of 1,499 Yoruba women and 1,497 Yoruba men in the Western and Lagos states of Nigeria (Australian National University, 1974). A second, much smaller study of 202 Yoruba men was conducted in 1974–75 (Orubuloye, 1977), and a study of 1,278 male and female Ibos, also in Nigeria, was conducted in 1974 (Okore, 1975, 1977). For Ghana there were two studies, an early (1963) survey of 709 rural households, in which respondents were entire households interviewed together rather than as individuals (Caldwell, 1967), and a smaller study in 1975 of 235 male and female Sisala of Northern Ghana (Mendonsa, 1977). The Kenyan study was conducted in 1974–75 with 656 Akamba (Kabwegyere, 1977).

Four of the five Latin American surveys were part of the same study, a rural fertility survey coordinated by the Centro Latinoamericano de Demografia between 1968 and 1969 (Simmons, 1974). The samples for these surveys in Mexico, Peru, Colombia, and Costa Rica were between 2,100 and 3,000 women selected to be representative of all women 15 to 49 years old in rural areas and small urban areas (populations of 20,000 or less) in each country. The fifth Latin American survey was quite different, a study of only 60 married women and 75 married men from two housing projects in Santiago, Chile (Turner, 1975).

Information on the two Asian surveys came from preliminary reports. The study in Bangladesh was conducted in the village of Barkait around 1975. Although about 300 respondents were interviewed, data for only 102 have been reported (Barkat-e-Khuda, 1977). The study in Iran was conducted in the industrial city of Shiraz at about the same time. Again, data for only 107 respondents have been reported (Mehryar, Tolnay, and Jamshidi, 1977), though the sample was much larger.

Relevant characteristics of all the surveys in both sets are summarized in Table A1 in Appendix A. A few other studies provide the same type of data, but involve countries that were part of the VOC project. Because the VOC countries have been covered with representative samples, these other studies will not be discussed. There is one exception, however. Data from the Survey of Fertility in Thailand, conducted in 1975 as part of the World Fertility Survey, are presented in Appendix B to clarify some characteristics of the measures used in this paper. The data were for 2,960 husbands, those who could be matched with their wives after fieldwork was completed (Arnold and Pejaranonda, 1977). These data will not be included, however, in the main comparisons.

The countries covered by the surveys under consideration were divided into five groups by fertility level: countries with extremely high fertility, very high fertility, high fertility, moderate fertility, and low fertility. Table 3 indicates the grouping, which includes the nine VOC countries and was based on fertility rates from external sources. The cutting points were chosen to provide as much separation between groups as possible on each of the indicators. It can be seen that most

TABLE 1 Predicted effects of demand-related explanatory factors on values and disvalues attached to children

4

	Explanatory factor				
Value or disvalue cluster	Mortality reduction (Demographic)	Rising aspirations (Psychological)	Vanishing economic roles for children (Economic)	Emergence of the conjugal family (Social)	Weakening cultural props (Cultural)
Value cluster					
1 Instrumental assistance	D1 Insurance against mortality should become less prominent		E1 Economic benefits should decrease		C1 Status, social benefits should become less prominent
2 Rewarding interactions				S2 Marital bond, companionship should become more prominent	
3 Psychological appreciation		P3 Should become more prominent			
Disvalue cluster					
4 Financial costs		P4 Should rise		S4 Should rise	
5 Childrearing demands		P5 Should become heavier		S5 Should become heavier	
6 Restrictions on parents		P6 Should become more prominent			
7 Costs to social relationships				S7 Marital strain should become more prominent	C7 Concern about overpopulation should become more prominent

NOTE: Each predicted effect is identified by a capital letter and a number. The letter represents the explanatory factor (as characterized in parentheses in the table heading); the number represents the value or disvalue cluster affected.

SOURCE: Bulatao (1979:8).

TABLE 3 Fertility rates for countries surveyed

Country and group or area surveyed	Date of survey	Population			
		Crude birth rate (1976)[a]	Gross reproduction rate (1973)[b]	Total fertility rate[c]	Survey sample's ideal family size[d]
EXTREMELY HIGH FERTILITY		(47–49)	(3.300–3.600)	(6,100–7,750)	(>6.1)
Kenya (Akamba)	1974–75	49	3.300	7,705	[e]
Nigeria					
Ibo	1974	49	3.300	6,141	8.0, 8.0[f]
Yoruba	1975				>6[g]
Western-Lagos	1973				7.6, 7.6[h]
Ghana					
Rural	1963	49[i]	3.300	7,002	8.0[j]
Sisala	1975				7.5[k]
Bangladesh (Barkait)	ca. 1976	47	3.520	6,581	6.4, 7.0[l]
VERY HIGH FERTILITY		(41–45)			(4.6–6.1)
Iran (Shiraz)	ca. 1976	45	3.350	7,661	[m]
Sierra Leone	1969	45	2.900	5,262	6.1
Colombia	1968–69	45[n]	2.870	3,967	4.6[o]
Mexico	1968–69	44[p]	3.150	6,565	6.0[o]
Peru	1968–69	41[n, q]	2.830	5,803	5.2[o]
HIGH FERTILITY		(35–41)	(2.200–3.100)	(5,050–6,050)	(3.3–4.0)
Philippines	1975	41[q]	3.100	5,505	3.5, 3.7
Turkey	1975	39	2.840	6,034	2.6, 2.9
Malaysia (West)	1978	39	2.216[r]	5,052[r]	4.0, 3.8
Indonesia (Java)	1975	38	2.700	5,939	4.0, 3.9
Thailand	1976	36	3.100	5,864	3.3, 3.4
India	ca. 1976	35	2.800	5,761	[s]
Costa Rica	1968–69	35[p]	1.880	3,913	4.8[o]

MODERATE FERTILITY		(20–29)	(1.350–1.950)	(3,100–4,550)	(2.5–3.1)
Republic of Korea	1976	29	1.940	4,516	2.5, 2.5
Chile (Santiago)	1973	28[t]	1.800	3,584	5.9, 4.9[u]
Taiwan	1976	23	[s]	3,211	3.0, 2.9
Singapore	1976–77	20	1.357	3,100	3.1, 3.1
LOW FERTILITY		(10–19)	(0.750–1.250)	(2,000–2,950)	(2.1–3.3)
Japan	1972–73	19[v]	1.040	2,069	2.9, 3.3
Australia (Sydney)	1977	18	1.214	2,950	2.9, 3.0
Netherlands	1975	14	0.931	2,584	2.4[w]
United States	1975	13	0.924	2,385[x]	2.6, 2.5
Belgium	1975–76	13	0.965	2,244	2.1[w]
West Germany (Bavaria)	1976	10	0.750	2,013	2.2[w]

[a] Source: *1976 World Population Data Sheet of the Population Reference Bureau, Inc.*

[b] Source: United Nations, *Demographic Yearbook 1975.*

[c] Source: Palmore (1978:16–37). Rates are for most recent census year.

[d] Unless otherwise indicated, the first figure is for females, the second for males.

[e] Forty percent of the women surveyed in Kenya said a woman should produce as many children as possible. In addition, 59 percent thought number of children should be up to God, 18 percent would follow the dictates of others, and only 23 percent thought they should decide for themselves.

[f] Responses greater than 12 and responses coded as "Up to God" were scored as 12. If the latter responses were excluded, the means would drop a little over one child, to 6.7 and 6.9. Responses coded as "As many as one can support" were considered ambiguous and were excluded.

[g] Seventy percent of the Yoruba men regarded six children as too small a family.

[h] Responses greater than 12 and responses coded as "Up to God" were scored as 12. If the latter responses were excluded, the means would drop to 5.7 and 6.0.

[i] For 1960, closer to the date of the first survey, the U.N. *Demographic Yearbook* gives a similar crude birth rate, between 47 and 52.

[j] For households. Responses greater than 12 and responses coded as "What God wills" or "As many as possible" were scored as 12. (If the latter two types of responses were excluded, the mean would drop about half a child to 7.4). Without truncation of the distribution at 12, and counting the results of further probing of those who did not cite a specific number, Caldwell reported a much higher mean of 13.3.

of the indicators were consistent in assigning a country to a particular group. The main inconsistencies in the classification appeared in the very high fertility group, where the gross reproduction rates and the total fertility rates indicated the Latin American countries should be in a lower group, but the crude rates, which corresponded more closely to the dates of the survey, led me to assign these countries to this particular group. A similar inconsistency appeared for another Latin American country, Costa Rica, which was in the high fertility group by one measure but belonged in a lower group by other measures.

Most of the samples were not nationally representative, and one should therefore investigate the correspondence between these national rates and sample rates. Measures of actual fertility for each sample would be useful, but were not uniformly available. However, most surveys did report preferences in regard to ideal family size or provided data from which these could be calculated. The last column in Table 3 presents this information. It can be seen that ideal family size preferences for these samples differentiated the groups fairly well, except for the two lowest fertility groups. Mean preferences in the extremely high fertility group always exceeded six children, and, in some calculations, went as high as 13. Preferences were in the range 4.6 to 6.1 in the very high fertility group and in the range 3.3 to 4.0 in the high fertility group. The ranges for the moderate fertility group (2.5 to 3.1) and the low fertility group (2.1 to 3.3) overlapped.

What are important to note are the four cases where sample preferences were discrepant with group assignment based on population fertility rates. The first case was Iran. Ideal family size was not reported for this sample, but it was reported that three-fourths of the respondents saw no advantages to a large family. This finding appears inconsistent with having an ideal family size of around five. In each of three other samples in this group, no more than one-fourth of the respondents said a large family had no advantages (Simmons, 1974:132). The second case was Turkey, one of the countries in the VOC project, where fertility preferences were lower than expected. That Turkey was exceptional in some ways was previously noted (Bulatao, 1979: 92). The third and fourth cases were the Latin American countries Costa Rica and Chile, where ideal family size was considerably larger than was appropriate for its group. For Costa Rica, this was probably due to the sample's underrepresenting the urban population, where rapid fertility decline has taken place. For Chile, as for Iran, the sample was quite small and highly selected. Among these four cases, only the sample for Turkey was designed to be representative. Turkey was kept in the analysis, but the other three cases were left out, although data for these cases are included in the appendix tables. The basis for the exclusions, it should be noted, was that these three samples appeared grossly unrepresentative. The exclusions were not related to whether or not the data supported the predictions. Many of the other smaller samples were not designed to be representative either, but at least their fertility preferences were roughly in the expected range.

What were left, then, were data for 14 countries, in addition to the nine countries in the VOC project. Four of the six Set A countries had low fertility and the other two had high fertility, whereas the eight Set B countries had either very high or extremely high fertility. These countries complemented the VOC countries well, allowing further investigation of values at low fertility levels and permitting comparisons not previously possible at the extremely high fertility end.

These comparisons were complicated by one factor, the relative cultural homogeneity of each group. The extremely high fertility group was mostly sub-Saharan African, the very high fertility group mainly Latin American, the high fertility group largely Southeast Asian, the moderate fertility group mainly East Asian, and the low fertility group essentially Western. Given present-day distributions of fertility rates, it is not possible to obtain proportional representation for each cultural area in each fertility group. There were, at least, exceptions from the cultural majority in each group, such as Bangladesh in the extremely high fertility group and Japan and Australia in the low fertility group. Little can be done methodologically about the confounding between culture and fertility level in this paper, but a few additional observations about this problem are contained in the discussion section below.

The reports on the individual surveys did contain considerable detail about the cultural and societal contexts in which the value of children is embedded. These reports were so variable in coverage, content, style, and authority, however, that it was difficult to draw conclusions from them. With one exception, the reports were not comparative and did not draw conclusions from differences in the value of children across countries. The exception was the article by Simmons (1974) on the four parallel Latin American surveys. Simmons focused on the pattern of ambivalence revealed by whether women cited both advantages and disadvantages to large and to small families. He concluded that ambivalence was common and should affect the interpretation of expressed fertility preferences. Simmons paid less attention to the specific advantages and disadvantages cited. The concern in the present paper is explicitly with specific values and disvalues compared across fertility levels.

Measures

Each survey included a question on the advantages or disadvantages of having children. These questions took several forms. In the Set A surveys, the most common forms were the advantages and the disadvantages of having children, as opposed to not having children. (These were also the questions used in the VOC surveys.) One exception, in Set A, was the Indian study, in which respondents were asked why people in general want children. The variation in the questions used in Set B was greater (see Table A1 in Appendix A). In some surveys, the questions were positively phrased ("advantages of many children"), in others negatively phrased though essentially identical ("disadvantages of few children"). Questions varied in wording (e.g., "advantages" versus "good things" versus "value") and in question format (e.g., straight questions versus sentence completions). Because only English translations of the questions could be compared–and some of these were not given in full–it was difficult to evaluate all the variations. Positively and negatively worded questions could in some cases be contrasted; they led to some but no major differences in responses in no readily interpretable pattern.[4] These particular variations among questions, however, appeared to be less important than the numbers of children to which the questions referred.

Each question involved a comparison, implicit if not explicit, of two numbers of children: the first, to which advantages or disadvantages were to be ascribed; and the second, against which the first number was to be assessed. In the Set A surveys, respondents were asked to evaluate some children as opposed to no children. In the Set B surveys, they were usually asked to evaluate many as against few children (or few as against many), or some equivalent, such as large as against small families. What difference did the choice of contrasts make? Evidence was available from surveys in two countries, Nigeria and Thailand, in which both types of questions had been used. Appendix B evaluates the evidence, which indicates that the two types of questions are not radically different. Rather, they may be seen as lying on a continuum in reference to the type of contrast that is drawn, with contrasts of small numbers of children at one end (say, the contrast between no children and one child) and contrasts between large numbers of children at the other end (for instance, between 10 and 12 children). The extremes aside, the same basic responses are obtained across the continuum, Appendix B goes on to argue. There is, however, some bias in favor of particular values and disvalues as one moves up or down the continuum. Relative to the some versus none contrast in Set A, the many versus few contrast in Set B appears to emphasize both economic benefits and costs and to deemphasize rewarding interactions values (companionship, happiness, the marital bond) and restrictions on parents, while having less effect on other values and disvalues. This bias, though not excessive, could not be quantified, and it will be necessary therefore to keep the direction of the bias in mind when looking at the data.

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[4] See Tables A6, A7, B2, and B3 in the appendices.

A variety of coding schemes was originally used for tabulating responses to these questions. For the surveys in Set A, the coding schemes were modifications or extensions of the codes used in the first phase of the VOC project and were generally detailed. The categories used in each survey were reordered according to the V-code (for values) and the D-code (for disvalues), the extensive codes used in the second phase of the VOC project (Angeles, 1978), and collapsed into the general classes of values and disvalues shown in the Exhibit. The coding schemes used for the surveys in Set B were less detailed, usually consisting of fewer than ten categories, and somewhat variable, with various types of responses grouped that might otherwise be usefully distinguished. With Set B the same procedure was followed of translating coding categories into V-code and D-code categories and grouping these under the headings in the Exhibit. How categories were regrouped is illustrated in Table 4 for the four parallel Latin American surveys. Roughly 25 coding categories were originally used in these surveys, including such categories as the health of the mother, care of children, family income, religious reasons, and the well-being of society. One unusual feature of these categories was that they were used for both advantages and disadvantages, so that a particular code could have the opposite meaning when used for different questions. As Table 4 indicates, it was possible to fit the original coding categories under the master headings, though some ambiguities remained. For instance, the category "family harmony" was interpreted to mean harmony in the entire family, including children and possibly other relatives, and not just with the spouse, though it could have included some responses that should be coded under enhancing the marital bond. Code conversion was generally a fairly straightforward process, though there were a few other cases like this (pointed out in the footnotes to the appendix tables) where ambiguities remained.

EXHIBIT Advantages and disadvantages of having children, derived from content analysis of responses to open-ended questions

ADVANTAGES

- Instrumental assistance
  - Help in housework
  - Help in old age
  - Financial, practical help
  - Family name, line
  - Religious, social obligations
  - Adult status, social norms
- Rewarding interactions
  - Companionship, love
  - Happiness
  - Play, fun, distraction
  - Marital bond
- Psychological appreciation
  - Living through children
  - Achievement, power
  - Character, responsibility
  - Incentive to succeed
  - Fulfillment
- Other

DISADVANTAGES

- Financial costs
  - Cost of education
  - Other financial costs
- Childrearing demands
  - More work
  - Emotional strain
  - Health, pregnancy
  - Discipline
  - Child's sickness
  - Worry over child's future
  - Other childrearing problems
- Restrictions on parents
  - Tied down
  - Can't work
- Costs to social relationships
  - Marital strains
  - Overpopulation
- Other

In the surveys in Set A, multiple responses to each question were coded and tabulated. The previous tabulations from the surveys in the VOC project also reported multiple responses, because it was felt that reporting all a respondent's answers would be more reflective of her thinking than only reporting one answer. The comparisons within Set A, therefore, utilized multiple-response percentages, i.e., percentages of those mentioning a specific value, regardless of whether this was the first, second, third, or later answer.[5]

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[5] There was one methodological problem. Regrouping categories during code conversion required combining some percentages, but multiple-response percentages for two different categories could not be simply added together, for respondents who gave answers in both categories would be erroneously counted twice. This problem was more severe for larger percentages, where the chances of overlap were greater. The solution was to reduce the percentages to single-response percentages, add them together as desired, and inflate them again to return to multiple-response percentages. The procedures for doing this are explained and justified in Appendix C. Where the raw data were available, as for Japan, these procedures were not needed. In the special case of Malaysia, for which only first-response percentages were available although two responses were obtained, the percentages were inflated to allow for 2.0 responses per subject for advantages and 1.6 responses for disadvantages, comparable to the response rate in other countries.

TABLE 4 Reordering of codes used in surveys in Colombia, Mexico, Peru, and Costa Rica for advantages and disadvantages of children

New categories	Old categories
ADVANTAGES OF CHILDREN	
Household, practical help	Children help their parents Socialization of children Care of children
Financial help	Family income Family welfare Economic motives
Family name, prestige	Family prestige Family in general
Religious, social obligations	Religious reasons Duty, traditional reasons Moral reasons Cultural reasons Society's well-being
Companionship, love	Pleasure of having children Family harmony
Other	All other categories
DISADVANTAGES OF CHILDREN	
Cost of education	Education of children Education in general
Other financial costs	Family income Family welfare Savings, inheritance Economic motives
Health, pregnancy	Health of mother Health of father Health in general
Sickness of children	Health of children
Other childrearing problems	Socialization of children Care of children
Tied down	Mother's free time
Can't work	Mother's job Mother's profession
Marital strains	Family harmony
Other	All other categories

The majority of the surveys in Set B, on the other hand, reported only a single response to each question, and the percentages were therefore lower than the percentages that would have been obtained if multiple responses had been coded and tabulated. Although single-response percentages could be compared among themselves, direct comparisons with multiple-response data were not possible. To permit such comparisons, a procedure was developed for inferring single-response from multiple-response percentages. This procedure involved taking folded logs or logits of the percentages and reducing each number by some constant so that the corresponding percentages totaled 100. The procedure, described in Appendix C, yielded rough though sufficiently accurate estimates. I converted all the multiple-response percentages from Set A surveys, therefore, by this procedure to single-response percentages before comparing them with Set B data.[6]

Given these various qualifications regarding the measures of value and disvalue salience as well as the limitations of some of the samples, one might question the worth of examining these data at all. The Set A data, it should be noted, required fewer reservations and were generally closely comparable to the VOC data. The Set B data admittedly suffered from various deficiencies. The recoding and adjustments discussed did allow some comparisons, however. These comparisons cannot provide definitive proof of the transition in the value of children, but they can at least indicate whether it may be worth attempting to collect new data. If despite the qualifications these comparisons still confirm the previous findings about the transition in the value of children, this confirmation should suggest that these findings are "robust," insensitive to variations in the research approaches, methods, and perspectives that guide data collection. If the previous findings are not confirmed, however, methodological differences cannot be ruled out as an explanation.

RESULTS

Comparisons among the values and disvalues attached to children in different countries will now be made. Although all the comparisons will be cross-sectional, changes in values over time are being inferred from them, and I will sometimes describe them as if they were longitudinal.

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[6] There was another difference between the two sets. In Set A, such responses as "There are no advantages" were included in the tabulations under the "other" category. In Set B these responses as well as the "don't know" response were left out (so that the remaining categories totaled 100 percent). There was much greater variance in the frequency of these responses in Set B, partly because of the variation in the forms of the questions used. In comparing Sets A and B, the "other" category was left out for Set A.

Vanishing economic roles for children

If a reduction in the economic roles that children play is an essential part of the fertility transition, it should be reflected in less mention of economic values attached to children at lower fertility levels. Figures 1 and 2 present the data on this point. (Specific percentages are given in Appendix A.)

Figure 1 indicates through bar graphs the salience of each of the three economic value categories – help in housework, help in old age, and financial and practical help. Separate bars represent the women and the men in each Set A country (Malaysia, India, Japan, Australia, the Netherlands, and Belgium). Included in the figure are shaded bars indicating the mean salience of each value in each of the three groups of countries (high fertility, moderate fertility, and low fertility) in the VOC project. The shaded bars show what the previous finding using only the VOC countries was: that each economic value declined at lower fertility levels. The Set A data reinforced this finding. In Malaysia and India, which were grouped with the high fertility countries, the value of help in old age was extremely salient, more salient than in any other country. The other two economic values were generally less salient in Malaysia and India than in the VOC high fertility countries, though still clearly more salient than in the Set A low fertility countries. In these low fertility countries, the salience of help in housework fell in the range of rates for West Germany and the United States (i.e., between 0 and 3 percent). The salience of help in old age was also correspondingly low, nowhere exceeding 11 percent. And the range in these countries for financial and practical help was 0 to 7 percent, whereas the minimum in the VOC countries outside the low fertility group was 11 percent.

Earlier I summarized the relation between value salience and fertility across the VOC countries by using correlations between salience and 1976 crude birth rates (Bulatao, 1979:90–91). For the present study I recalculated correlations with the addition of the Set A countries, to see what difference they made.[7] (Table 5 reports coefficients

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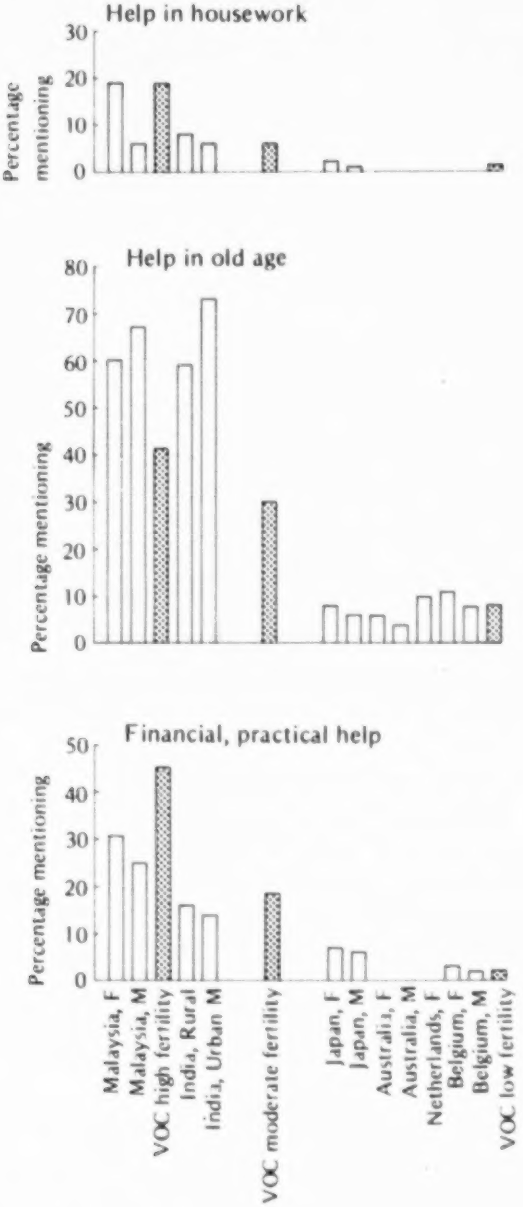
[7] Because these coefficients were previously calculated for females and males separately, it was necessary to make some decision regarding the Indian respondents, who were not divided into female and male but into urban and rural. The urban sample, being all male, was included among the other male samples. The rural sample was then arbitrarily included among the female samples, even though it was both female and male.

FIGURE 1 Salience of economic values for Set A countries by sex and for groups of VOC countries



Help in housework

Help in old age

Financial, practical help

NOTE: Percentages for all the bar graphs were derived from Tables A2 and A3 in Appendix A and from Bulatao (1979). Multiple responses were assumed.

TABLE 3 *(continued)*

k For males. The author does not make clear whether this is from the same survey or from another survey of the Sisala he conducted.

l Responses greater than 7 were scored as 7; responses coded as "Up to God" were scored as 12. If the latter responses were excluded, the means drop by about one child to 5.3 and 5.8.

m From 74 to 77 percent of the Shiraz sample saw no advantages in a large family.

n For 1966–70, from the U.N. *Demographic Yearbook*.

o Only for the currently mated women in the sample.

p Average for 1968 and 1969, from the U.N. *Demographic Yearbook*.

q Whether Peru and the Philippines should be grouped together is difficult to decide. They were put in separate groups essentially because of the considerable difference in ideal family size.

r Congruent with the sample, these rates are for West Malaysia.

s No information available.

t For 1972, closer to the survey date, the U.N. *Demographic Yearbook* gives a crude birth rate of 26.3.

u For low-income and middle-income Santiago respondents respectively.

v For 1972, the U.N. *Demographic Yearbook* rate was 19.4.

w For women.

x For white population.

TABLE 5 Association of values with fertility rates across countries
(Correlation coefficients)

Values	Value of Children project countries and Set A countries combined				All countries	
	Correlation with crude birth rate		Change in correlation from adding Set A countries		Correlation with crude birth rate	Correlation with ideal family size
	Female	Male	Female	Male		
Instrumental assistance						
Help in housework	.77	.69	+.04	−.01	.72	.49
Help in old age	.83	.77	+.08	+.07		
Financial, practical help	.85	.80	−.02	−.04		
Family name, line	.39	.35	+.32	+.39	.62	.79
Religious, social obligations	.46	.49	−.10	+.09	.22	.29
Adult status, social norms	−.37	−.07	+.23	+.22		
Rewarding interactions						
Companionship, love	−.77	−.85	+.04	+.05	−.76	−.72
Happiness	−.18	−.13	+.01	−.07		
Play, fun, distraction	−.19	−.51	+.04	+.02		
Marital bond	−.83	−.88	−.01	−.04	−.89	−.72
Psychological appreciation						
Living through children	−.43	−.58	−.06	−.21	−.84	−.66
Achievement, power	−.61	−.56	−.16	−.07		
Character, responsibility	−.62	−.67	+.07	−.31		
Incentive to succeed	−.28	−.47	−.52	−.47		
Fulfillment	−.85	−.71	−.03	−.03		

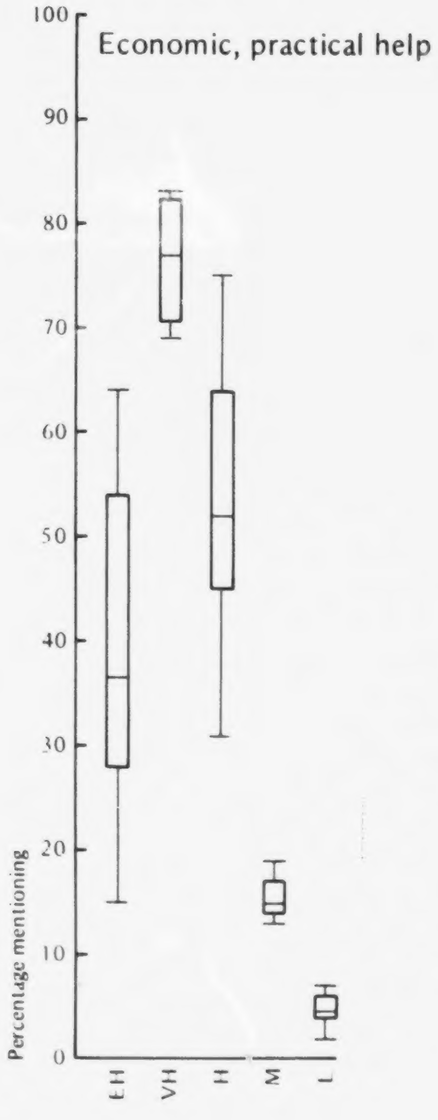
NOTE: The value indices correlated with fertility rates are the percentages of respondents mentioning each value.

for all the values, Table 6 for all the disvalues.) I have already noted that these coefficients should be treated with caution, because, for values of low salience, relatively slight differences in percentages can produce large coefficients. This qualification does not apply to the economic values, which were relatively high in salience across countries. As Table 5 indicates, adding the Set A countries produced very little change in the coefficients for the three economic values, which remained at or above 0.69. The additional data were therefore quite consistent with the previous pattern.

In Figure 2 percentages for all three economic values are added together and data are reported for Set B, Set A, and the VOC countries combined, with the subgroups for each survey (usually female and male) treated as separate cases. Figure 2 is a box-and-whisker plot (Tukey, 1977:39–41). The distribution of value salience in each group of countries, from the extremely high fertility group to the low fertility group, is represented by a box that encloses the middle 50 percent of the distribution. The line through the box is the median of the distribution. The whiskers protruding from each end of the box extend as far as the maximum and minimum values of the distribution. For extremely high fertility countries, for instance, the box stretches from 28 to 54 percent, within which the middle half of cases in this group fall. The median is 37.5. And the whiskers extend from 15, the lowest percentage in the group, to 64, the highest percentage. As earlier noted, these data are single-response percentages, lower than the multiple-response percentages shown in Figure 1.

What Figure 2 adds to Figure 1 are the Set B data, for extremely high fertility countries (Kenya, Nigeria, Ghana, Bangladesh) and for very high fertility countries (Sierra Leone, Colombia, Mexico, Peru). It is to these two groups, therefore, that attention should be directed. The very high fertility countries reinforced the pattern of declining economic values. Salience was at 69 to 83 percent in these countries, well above salience in any other group. Economic values did not reach this level of salience in the extremely high fertility group, though they still were more salient than in moderate and low fertility countries. The data indicated a broad decline in the salience of economic values from higher to lower fertility levels. Also suggested was a possible early rise in economic values between extremely high and very high fertility levels. Given the very wide range for salience in the extremely high fertility countries, this early rise may be questionable. Differences in question type should be kept in mind in interpreting this diagram, for they appear to affect economic values (see Appendix B). An adjust-

FIGURE 2 Salience of economic, practical help at different fertility levels: all countries, single-response percentages



NOTE: In these box-and-whisker plots, the long box encloses the middle 50 percent of the distribution, the line through the box represents the median, and the broken lines or whiskers extend as far as the maximum and minimum values. Percentages for all the box-and-whisker plots were derived from Table A8 in Appendix A and were based on a single answer per respondent.

ment of as much as 10 percent downward in salience for each of the extremely high and very high fertility countries would not, however, greatly affect the interpretations.

I computed correlations between the salience of these grouped values in each sample and crude birth rate, as well as mean ideal family size, treating females and males as separate cases. (Tables 5 and 6 also contain these coefficients.) The correlation of economic values with crude birth rate was substantial and comparable to the previous correlations, at 0.72. The correlation with ideal family size was smaller, as was true for many of the other values, and only moderate.

The data considered here support the idea that vanishing economic roles for children is a factor in the fertility transition. They suggest the possibility, however, that some slight increase in the salience of these values may take place very early in the transition before the substantial declines later on. Because the evidence for this slight increase is not firm, it may be inappropriate to speculate about reasons.

Rising aspirations

In the previous paper I argued that, as modernization proceeds, the rise in the aspirations people have for their lives should be reflected in a variety of values and disvalues attached to children. Disvalues relating to the restrictions children impose on parents should rise in salience as parents' new aspirations for themselves compete with childbearing. Values involving psychological appreciation of children (for self-fulfillment, to satisfy achievement needs, for vicarious satisfactions, etc.) should become more salient, reflecting these new aspirations. Concern about financial costs as well as childrearing demands (more work, problems with disciplining children, worry about their future, etc.) should increase as parents aspire to give their children more or to make them more successful. These values and disvalues are diverse. But changes in each of them can be seen as resulting from the same psychological factor, the broadening range of wants, needs, and expectations that people hold for themselves and for their families. The link between rising aspirations for oneself and rising aspirations for one's children has been previously noted. For instance, Cassen (1976:790) saw both resulting from more education: parents "may acquire social or economic aspirations with which children would interfere; they may acquire aspirations for their children . . . which cannot be satisfied for more than a limited number of offspring." Changes in the salience of restrictions on parents and psychological appreciation values were confirmed with the VOC data, but the effects on financial costs and childrearing demands were not. Each of these value and disvalue changes will now be considered.

Restrictions on Parents

New desires generated by modernization should compete with traditional childrearing activities, making restrictions on parents more salient. I have divided these restrictions into two types, work restrictions and all other restrictions (or being tied down generally). As the shaded bars in Figure 3 indicate, I found for the VOC countries that being tied down (the considerably more common category) rose dramatically in salience, but work restrictions hardly changed. The Set A countries confirmed this pattern. India is not considered here because no information on disvalues was available. In Malaysia, the salience of being tied down was only 9 to 13 percent. In Japan, Australia, the Netherlands, and Belgium, the salience of this disvalue ranged from 37 to 55 percent, well above that in Malaysia and also above the maximum of 30 percent among VOC countries outside the low fertility group. In each of these four low fertility countries, being tied down was the single most salient disvalue. The salience of work restrictions, on the other hand, again showed no trend.

The correlations for these two disvalues confirmed the pattern (see Table 6). Being tied down was strongly correlated with crude birth rate, at about −0.85, and the addition of the Set A countries hardly changed the coefficients. The correlations for work restrictions, on the other hand, changed erratically: the formerly high negative correlation for women became less negative, and the formerly small positive correlation for men became slightly negative.

The Set B countries are added to the VOC and Set A countries in the first panel of Figure 4, where work restrictions and other restrictions are combined. Again the pattern was unmistakable: a sharp rise in the salience of restrictions, especially at lower fertility levels. The data for extremely high and very high fertility countries fit perfectly into the pattern. The pattern would not be disturbed even if some upward adjustment based on question format was applied to most Set B countries.

Psychological Appreciation

From childrearing, as from other activities, people seek new satisfactions as a result of modernization. The psychological appreciation values reflect these new satisfactions. A slight upward trend in these values was previously found with the VOC countries at lower fertility.

FIGURE 3 Salience of restrictions on parents for Set A countries by sex and for groups of VOC countries

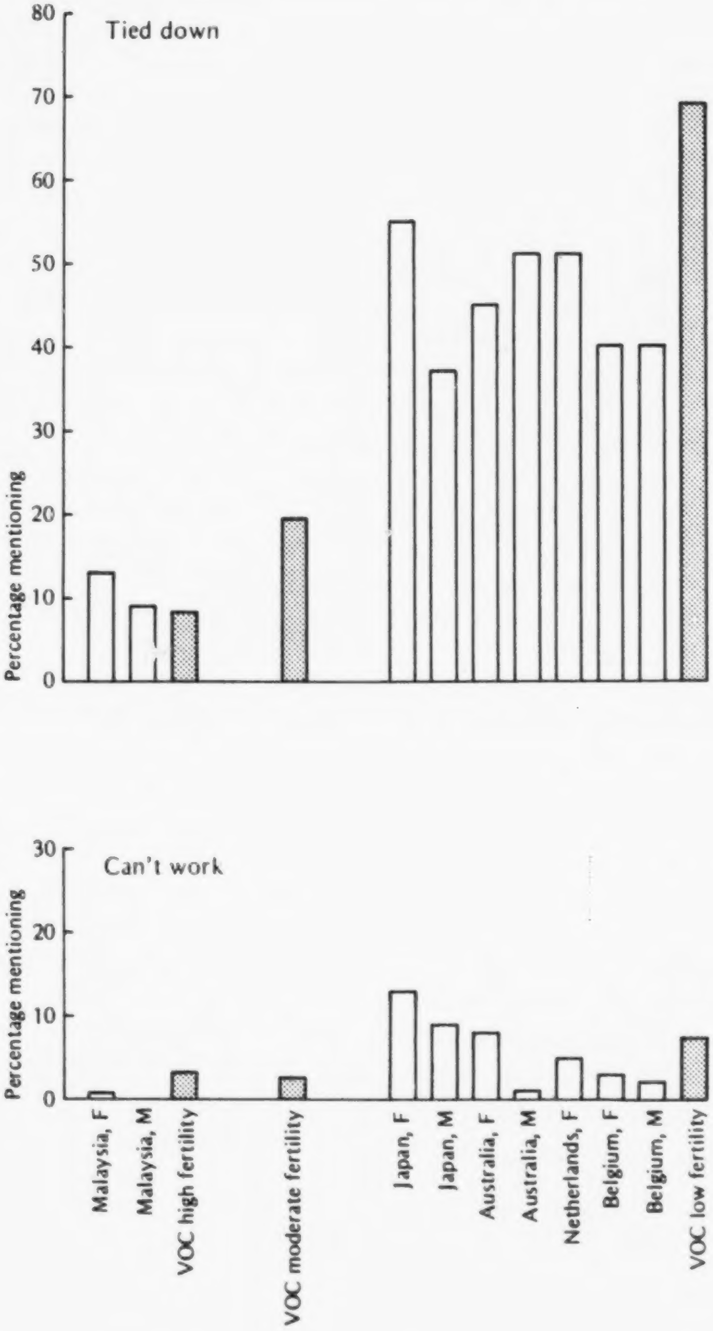
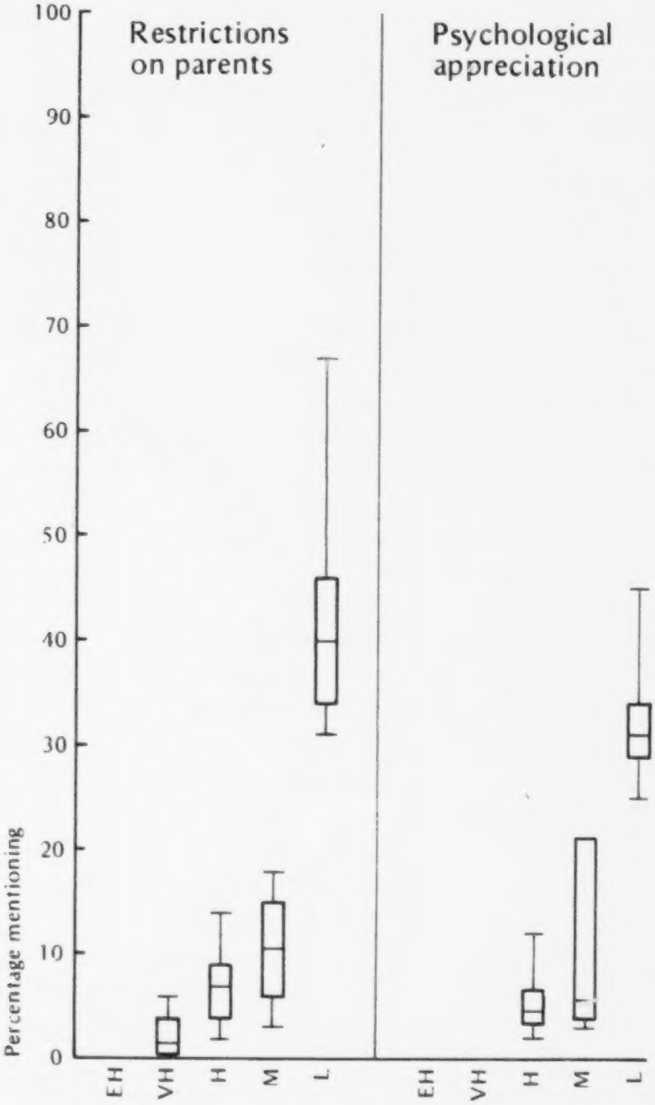


FIGURE 4 Salience of restrictions on parents and psychological appreciation at different fertility levels: all countries, single-response percentages



The shaded bars in Figure 5 show that this trend was clearest for self-fulfillment through having children and for satisfying achievement and power needs through children, and less clear for the other three psychological appreciation values. The Set A data were generally confirmatory. In the VOC countries outside the low fertility group, the maximum salience for fulfillment was 8 percent. In the Set A high fertility countries, salience stayed below this maximum (with the exception of the Indian urban sample, at 15 percent). In the Set A low fertility countries, the minimum salience for fulfillment was 10 percent and the maximum was 34 percent. For the value of achievement and power, similarly, the Set A high fertility countries showed low salience and the Set A low fertility countries showed high salience. For the other three values, the Set A data seemed to indicate a slightly stronger upward trend than previously obtained. Correlations with crude birth rate (Table 5) confirmed that the trend across countries in fulfillment was the strongest and was little changed by the Set A data, that the trend in achievement and power was moderately strong and was also little changed, and that the other values showed a stronger trend, particularly for men, with the additional data.

In adding Set B data, I collapsed all five value categories into one (Figure 4, second panel). None of these values, however, was even mentioned in any of the extremely high and very high fertility countries, so that the data perforce were confirmatory.

Financial Costs

Aspirations for one's children should rise together with aspirations for oneself, and should be reflected in greater concern about the financial costs of childrearing. The finding for the VOC countries, however, was that these costs did not rise in salience at lower fertility levels. The salience of educational costs, in fact, appeared to fall, whereas other financial costs–much more salient in the aggregate than educational costs–were essentially stable in salience (shaded bars in Figure 6). This finding was reinforced, for the VOC countries, with a separate question on the perceived financial burden of particular numbers of children. The Set A data were consistent with this finding. The salience of educational costs was as high as 11 percent in Malaysia but was zero for most Set A low fertility countries. Other costs, on the other hand, were variable in salience with no real trend. The strong positive correlations for the cost of education with crude birth rate were increased marginally by the Set A data; for other perceived financial costs the correlations became more positive but remained small (Table 6).

FIGURE 5 Salience of psychological appreciation values for Set A countries by sex and for groups of VOC countries

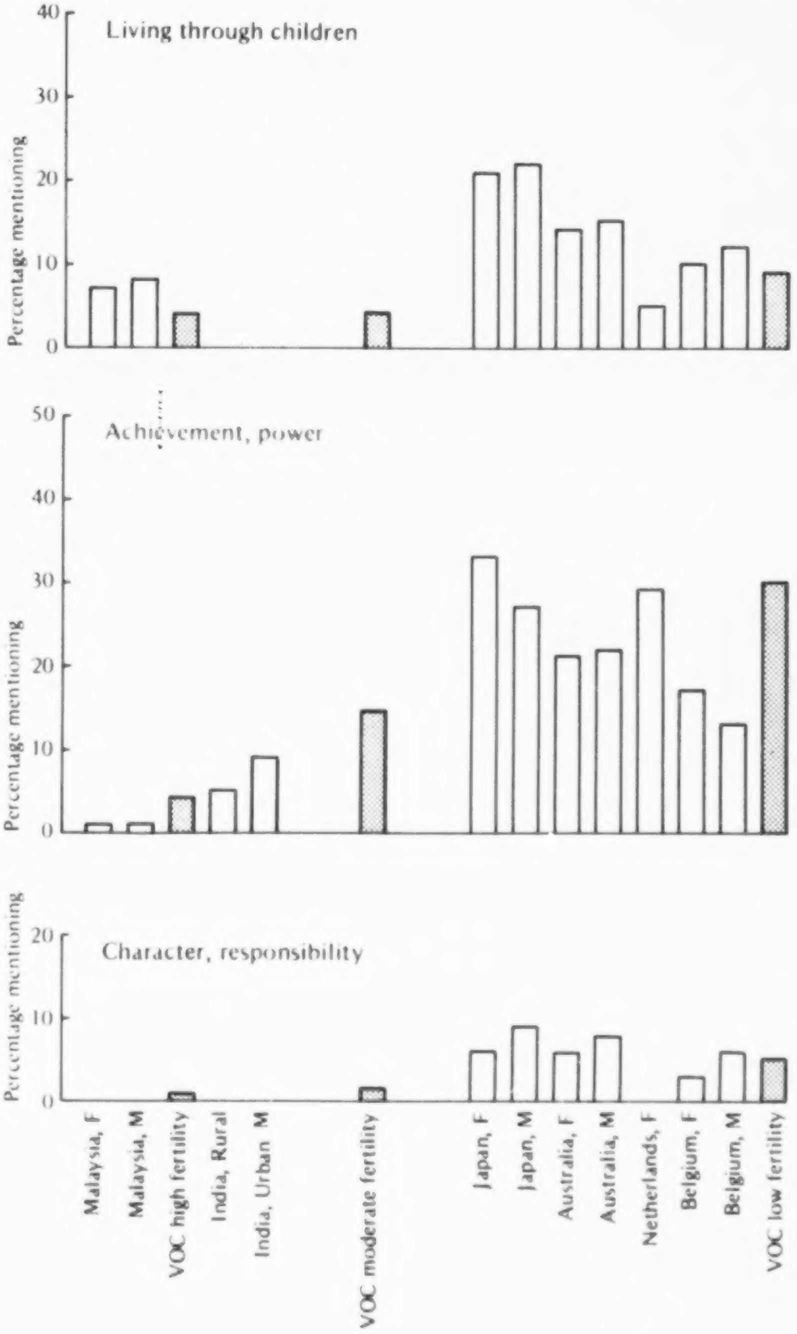


FIGURE 5 *(continued)*

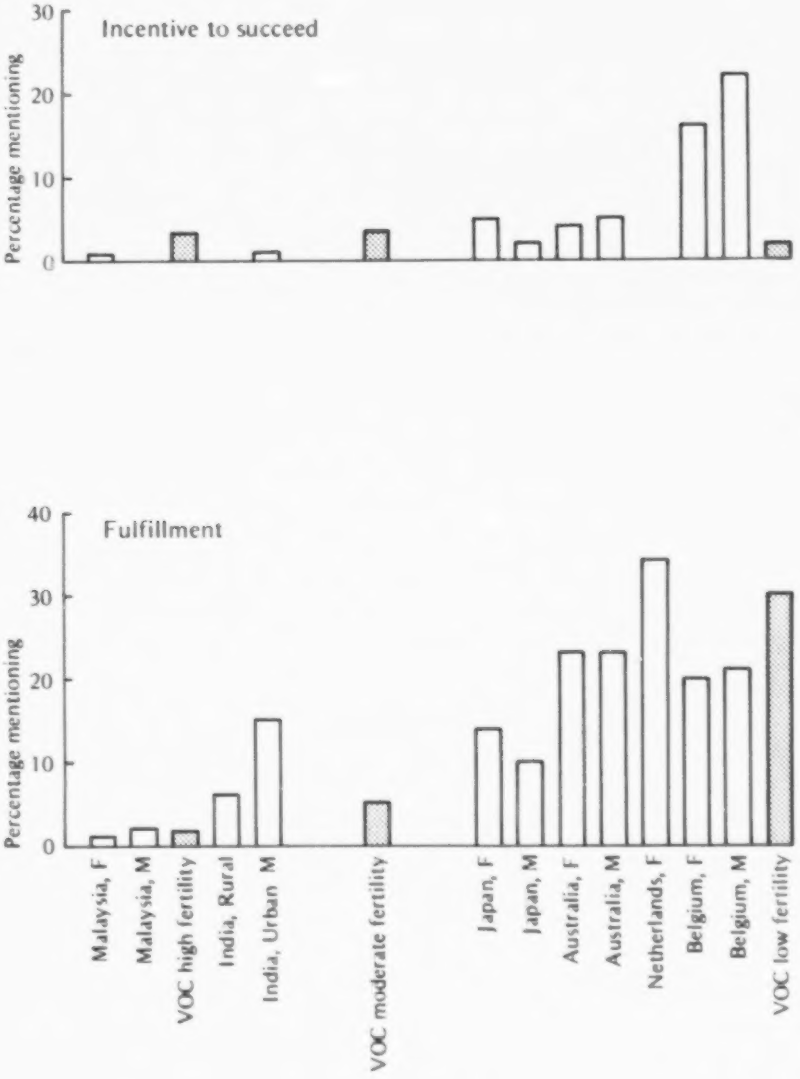


FIGURE 6 Salience of financial costs for Set A countries by sex and for groups of VOC countries

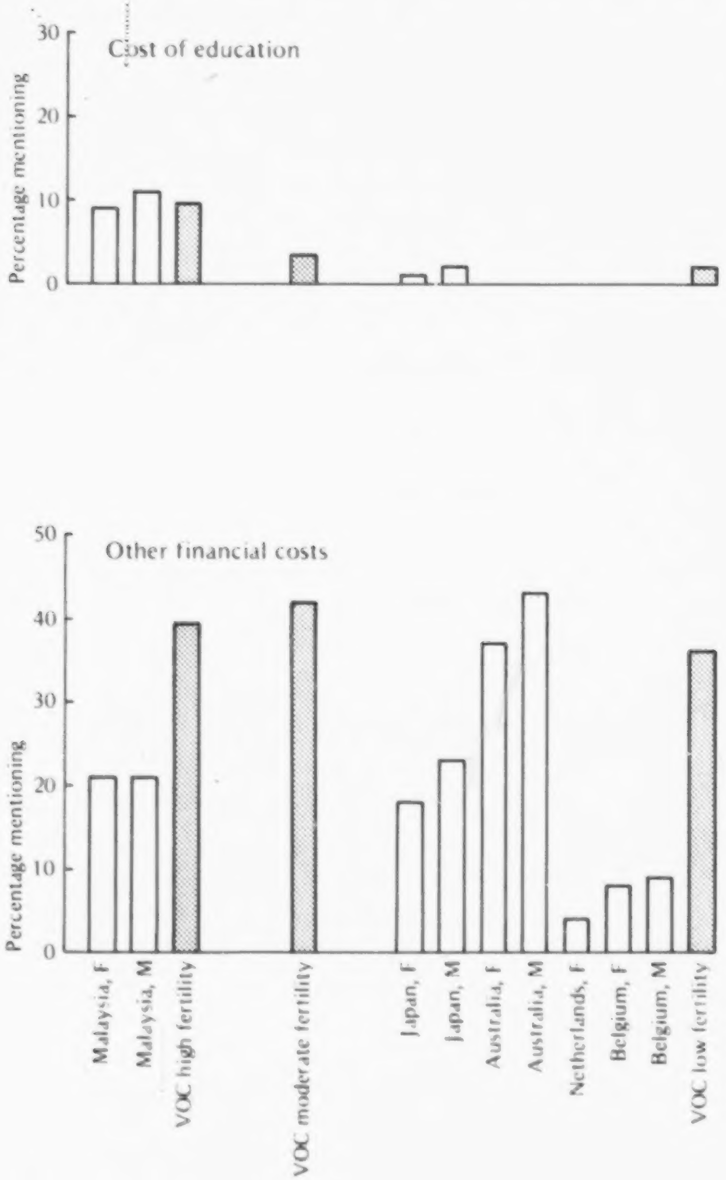


TABLE 6 Association of disvalues with fertility rates across countries
(Correlation coefficients)

Disvalues	Value of Children project countries and Set A countries combined: Correlation with crude birth rate: Female	Male	Change in correlation from adding Set A countries: Female	Male	All countries: Correlation with crude birth rate	Correlation with ideal family size
Financial costs						
Cost of education	.86	.88	+.07	+.08	.62	.57
Other financial costs	.36	.19	+.20	+.35		
Childrearing demands						
More work	.06	−.06	+.03	−.01		
Emotional strain	−.40	−.48	+.06	+.11	−.44	−.20
Health, pregnancy	.63	.58	+.02	+.16		
Discipline	.57	.57	+.06	+.20	.23[a]	.02[a]
Child's sickness	.40	.28	−.15	−.21		
Worry over child's future	.25	.13	+.07	+.14		
Other childrearing problems	.13	.33	−.10	−.18		
Restrictions on parents						
Tied down	−.87	−.83	+.01	−.07	−.85	−.62
Can't work	−.58	−.18	+.13	−.52		
Costs to social relationships						
Marital strains	−.39	−.49	+.11	−.05	−.53	−.46
Overpopulation	−.17	−.31	+.32	+.29	−.28	−.23

NOTE: The disvalue indices correlated with fertility rates are the percentages of respondents mentioning each disvalue.

[a] Includes all disvalues under "childrearing demands" except emotional strain.

In the Set B countries, costs appeared very salient (Figure 7, first panel). In the extremely high fertility countries, salience was between 51 and 96 percent (of single responses) in every country except one. In the very high fertility countries, the salience of costs ranged from 57 to 81 percent. In the other three groups combined, the salience of costs ranged from 4 to 59 percent. As should be expected from Figure 7, a moderately strong correlation of 0.65 with crude birth rate was obtained for all countries combined. There was more of an indication with Set A and Set B data than with VOC data alone that the salience of general financial costs, and not just educational costs, actually declines rather than rising as fertility falls. However, the Set B data may have overemphasized these costs because of the form of question. In addition, other measures of perceived costs could not be investigated. The basic conclusion, however, required no qualifications: parents may indeed spend more money on their children as they have fewer of them, but the economic burden does not increase in salience among the disadvantages of having them.

Childrearing Demands

As with financial costs, childrearing demands should rise in salience as parents' investment in children rises to meet new aspirational levels. However, the previous finding with VOC data was that childrearing demands generally did not rise at lower fertility levels. The shaded bars in Figure 8 show that concerns about discipline and children's sickness were indeed found to decline slightly, emotional strain due to children to increase at moderate fertility levels, and the other disvalues to remain largely unchanged. The Set A data did support some decline for discipline but not for child's sickness, which was lower in salience in Malaysia than in the low fertility countries. For emotional strain, salience in the low fertility Set A countries was roughly in the range of salience in the United States and West Germany, i.e., above salience in high fertility countries but below salience in moderate fertility countries. In each of the low fertility Set A countries emotional strain was also the most salient of all the childrearing demands. The correlation coefficients in Table 6 confirm the somewhat muddled picture and indicate that the Set A data did not greatly change any of the coefficients, except for children's sickness (for which the Set A data weakened the previously observed trend).

In adding Set B data, I separated emotional strain from the other childrearing demands, which were all added together (Figure 7, second and third panels). The variability in the extremely high fertility coun-

FIGURE 7 Salience of financial costs and childrearing demands at different fertility levels: all countries, single-response percentages

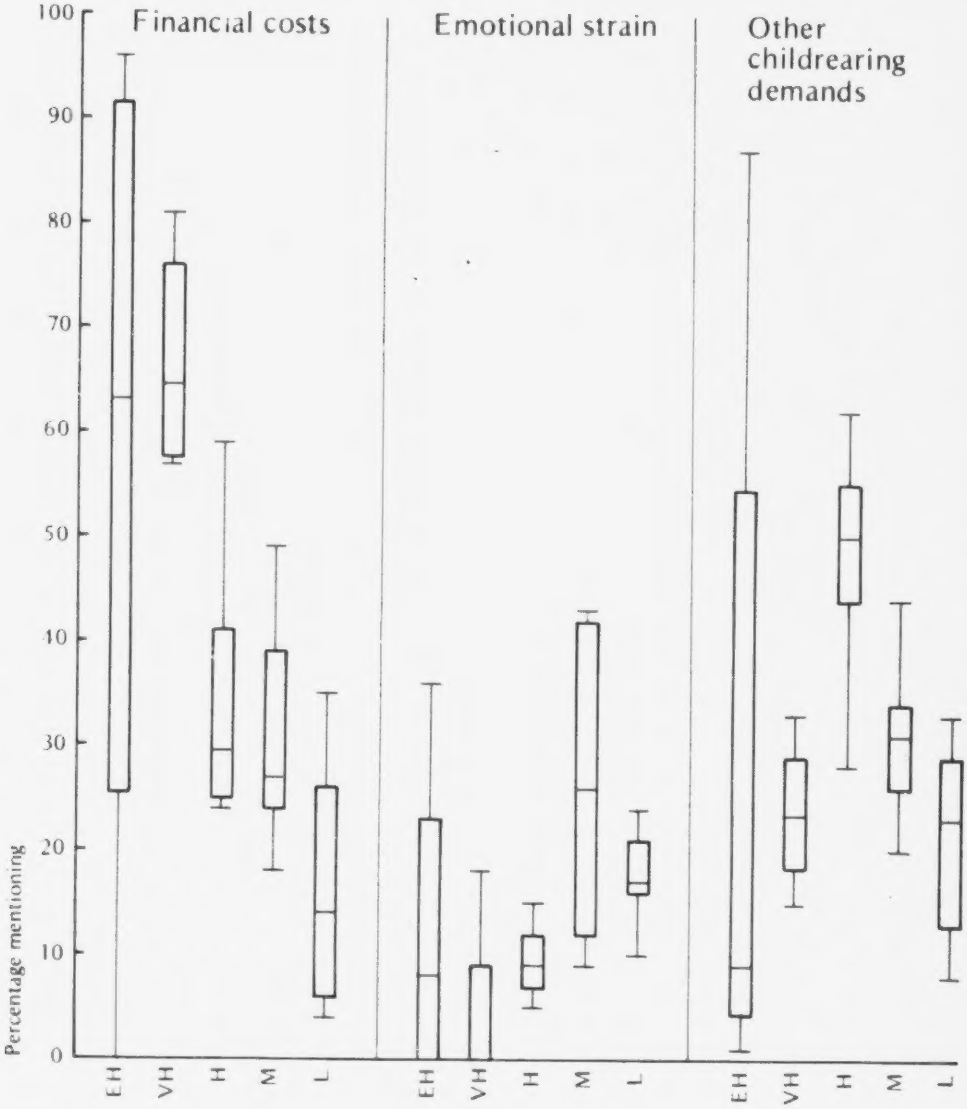


FIGURE 8 Salience of childrearing demands for Set A countries by sex and for groups of VOC countries

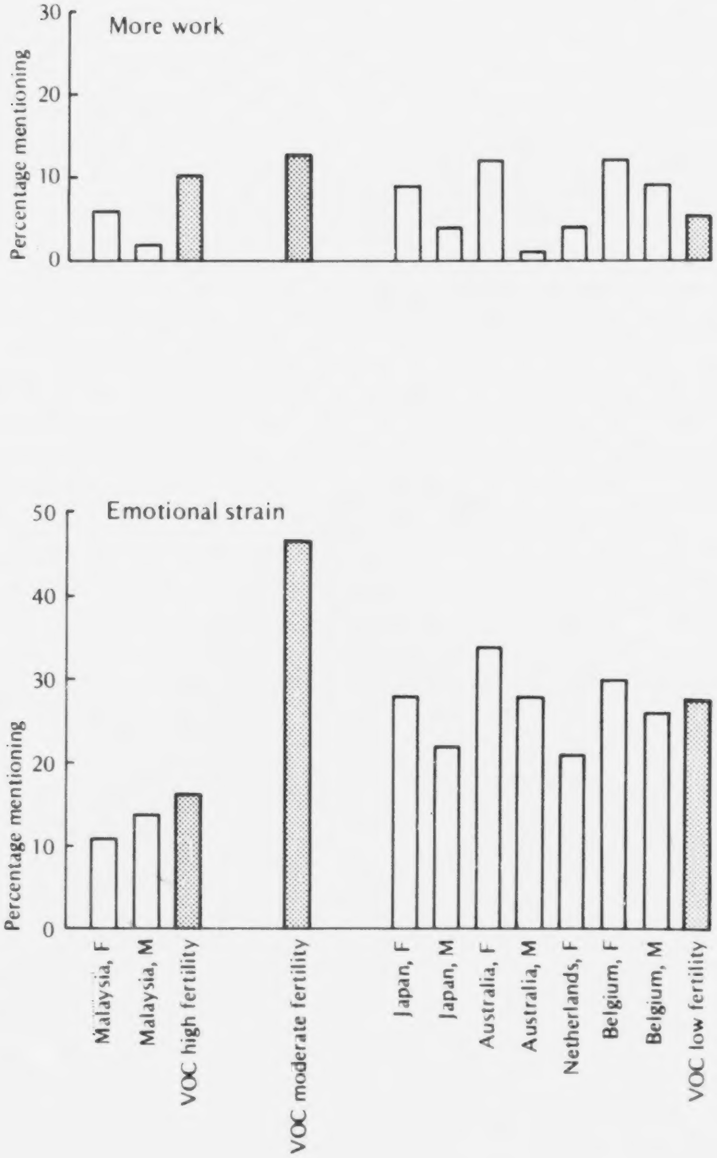


FIGURE 8 *(continued)*

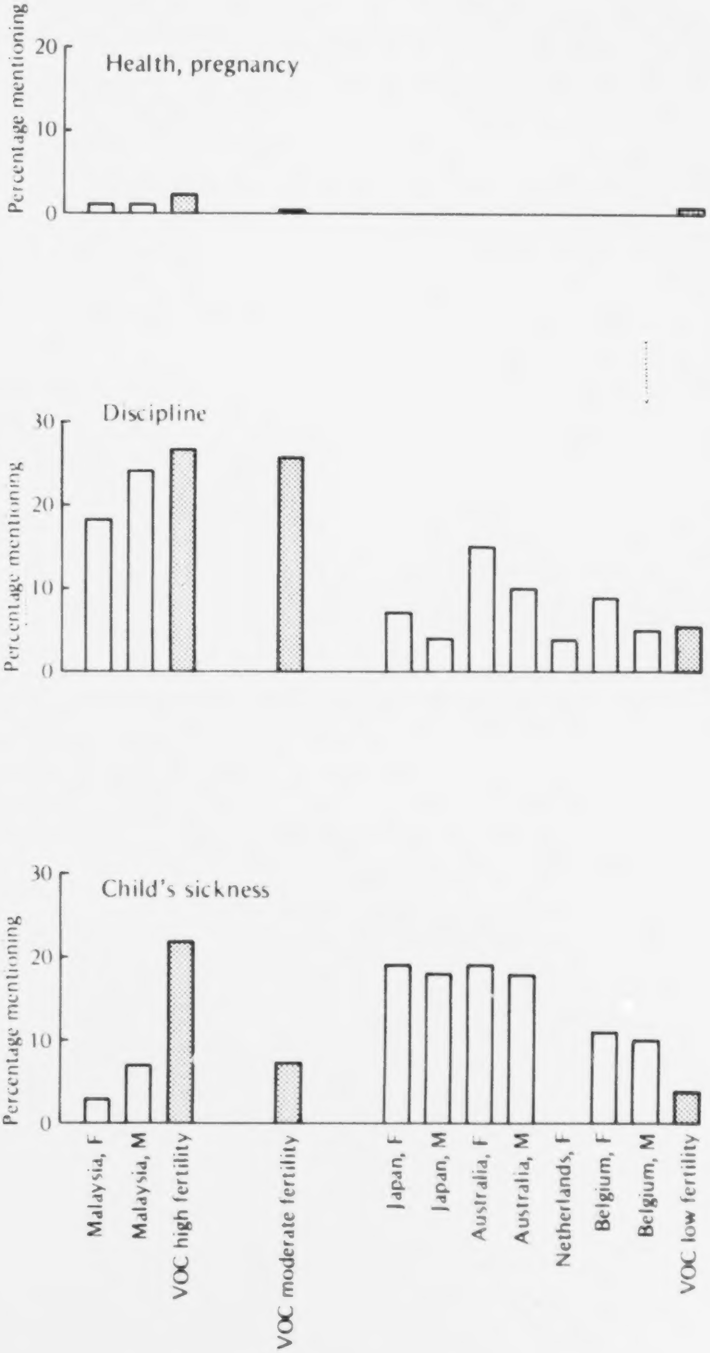
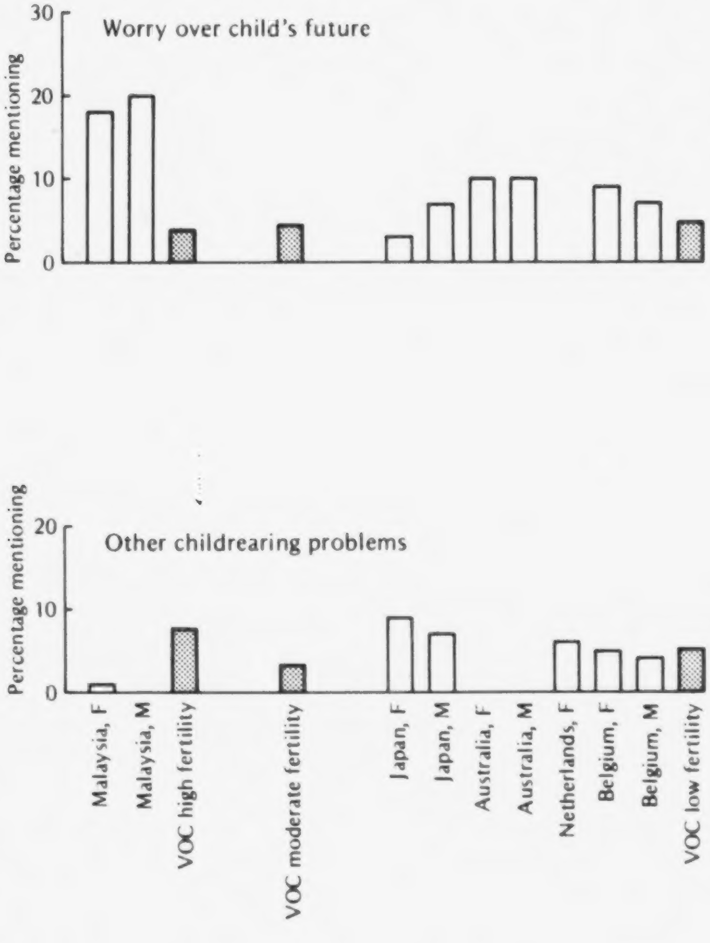


FIGURE 8 *(continued)*



tries was considerable and did not help to support any trend. In the very high fertility countries variability was less and childrearing demands were not highly salient. The resulting correlations for all countries were negative but only moderate for emotional strain and slightly positive for other childrearing demands.

For the different sets of values and disvalues that should have increased in salience because of rising aspirations, the additional data considered here confirmed the previous findings for the VOC countries: two sets rose in salience and two did not. Restrictions on parents and psychological appreciation values rose, financial costs and childrearing demands did not. Costs, in fact, appeared to decline. The previous interpretation for the contradictory findings was that rising aspirations were basically of two types—aspirations for oneself and aspirations for one's children. Values and disvalues attached to children confirm a rise in the former as a factor in fertility decline. If there is a rise in the latter, it is not disproportionate to rising income levels and does not imply any greater childrearing burden.

Emergence of the conjugal family

As with the rising aspirations factor, the shift from the extended household to the conjugal family as modernization progresses was hypothesized to affect several sets of values and disvalues. It was predicted that, as the conjugal family assumed full responsibility for childrearing, financial costs and childrearing demands would rise in salience. Unable to distribute costs among a wide circle of relatives, the conjugal family should experience the demands on its wealth as well as on its efforts and energy as heavier burdens. Elsewhere I have shown (Bulatao, 1979:52–67) that the VOC data contradicted these predictions. The data just considered also showed that costs and childrearing demands do not become more salient with lower fertility. Other predictions can be made, however. In contrast to the extended family, the conjugal family, turned in upon itself, should be more concerned about the quality of intimate interpersonal relations between the spouses, between parent and child, and among the children. It was predicted, therefore, that rewarding interactions within the family as well as marital strains, as values and disvalues attached to children, would become more salient as families grew increasingly conjugal.

Rewarding Interactions

Four values that children bring to parents are included here: companionship and love; happiness; play, fun, and distraction; and enhancement of the marital bond. The shaded bars in Figure 9 indicate the

FIGURE 9 Salience of rewarding interaction values and marital strains for Set A countries by sex and for groups of VOC countries

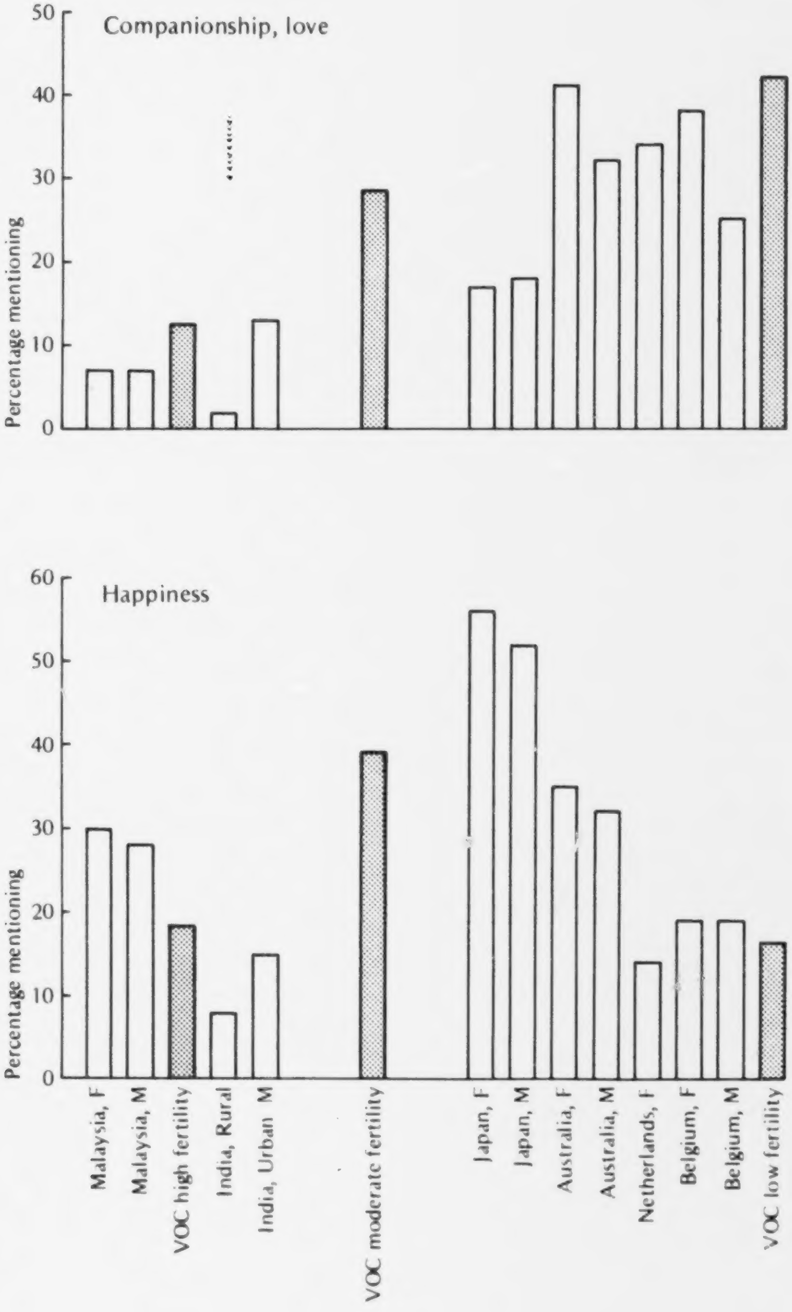
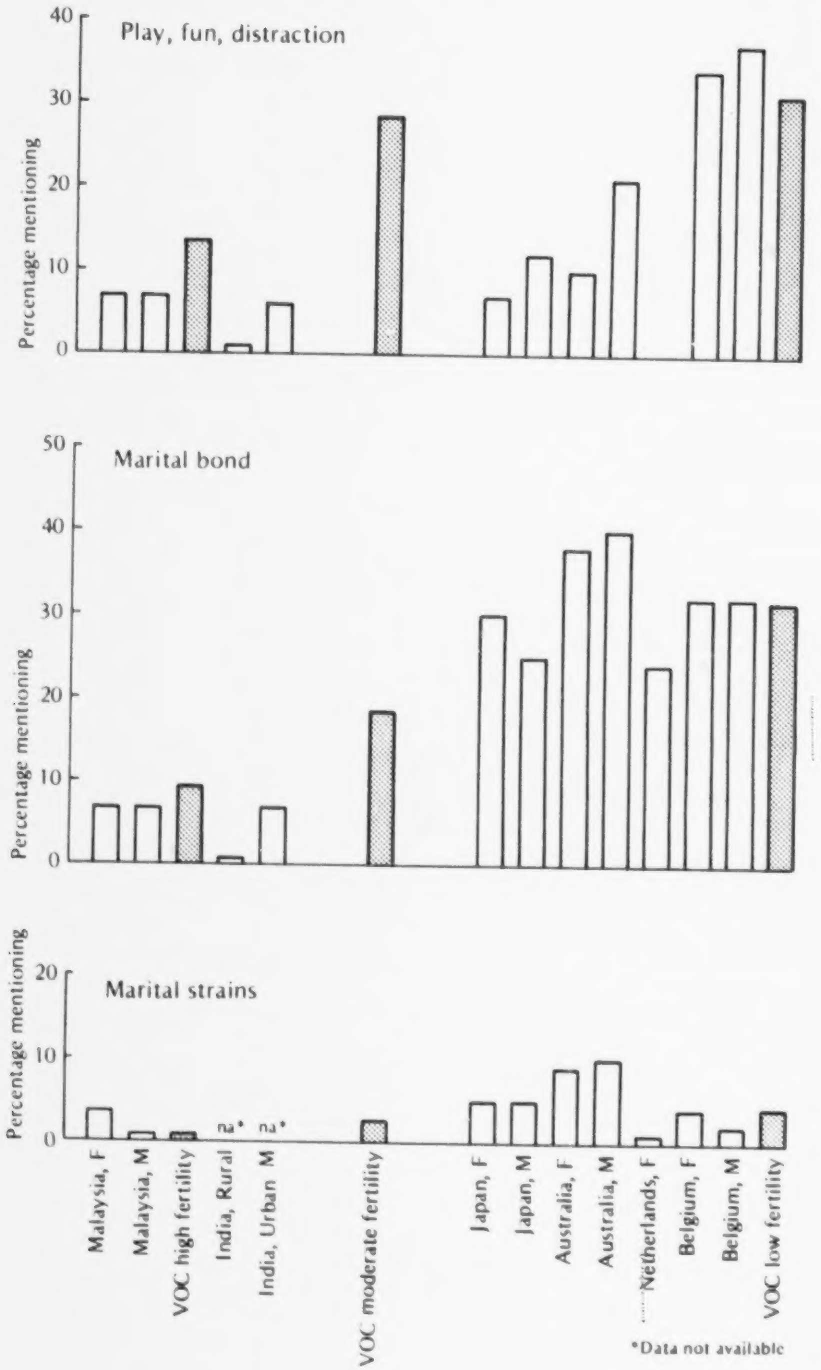


FIGURE 9 *(continued)*



*Data not available

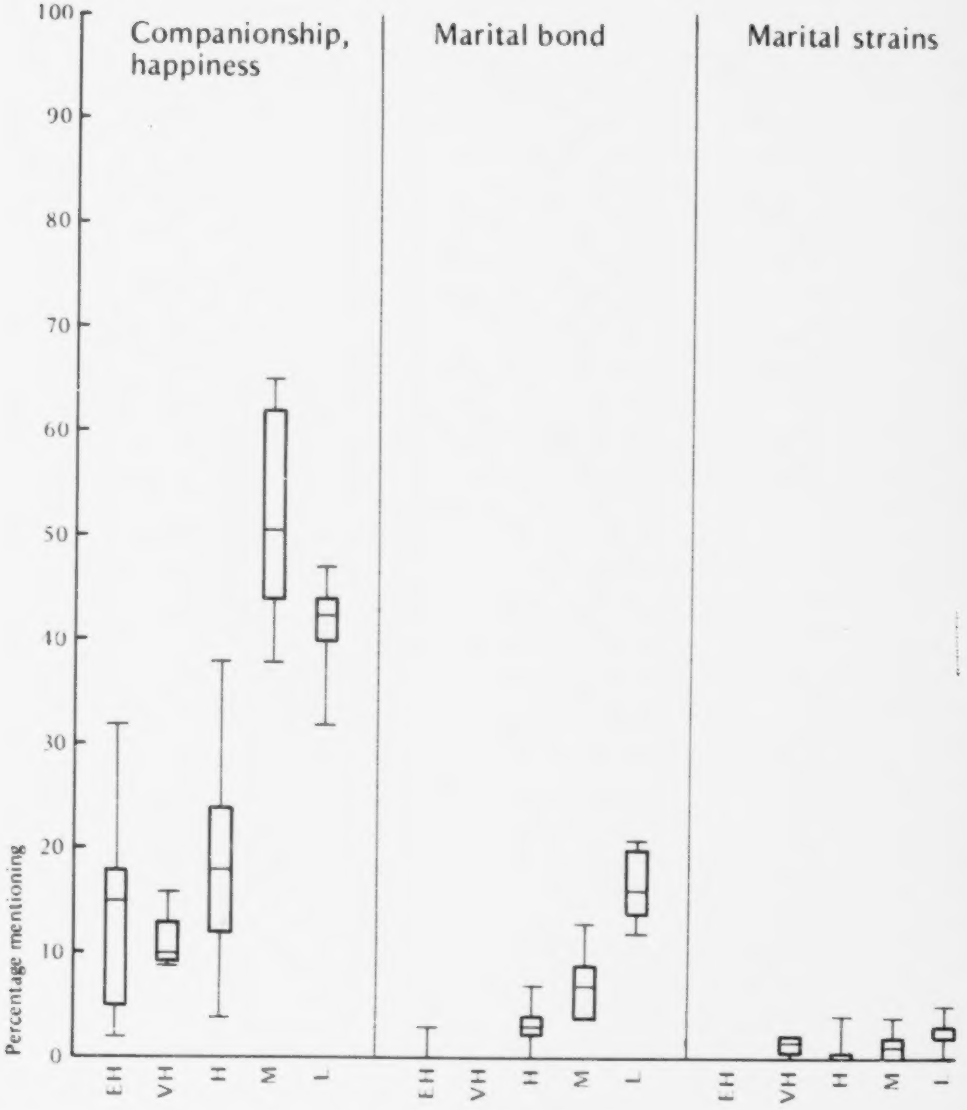
trends across the VOC countries: upward for companionship and love and for the marital bond; marginally upward for play, fun, and distraction; and unclear for happiness. The Set A data provided support for the trend in companionship and love. This value was low in salience in Malaysia and India, as expected, and higher in salience in Australia, the Netherlands, and Belgium. But its salience in Japan was not quite as high as expected. Support was clearer for the trend in the marital bond. For Malaysia and India, salience was low at 1 to 7 percent. The Set A low fertility countries, on the other hand, had the same mean (32 percent) as the VOC low fertility countries, and salience never fell below 24 percent. Support was lacking for the trend in play, fun, and distraction, which was not coded for the Netherlands and was low in salience in Japan. As with the VOC data, problems in distinguishing this value and the value of happiness may be responsible for these results. One may note, nevertheless, that for happiness and play combined the percentages for Malaysia and India were generally below the percentages for the other Set A countries. The correlations (Table 5) substantiate the findings that companionship and the marital bond were the two rewarding interactions values that clearly increased in salience. In both cases, the correlations stayed essentially the same as they were for the VOC countries at around −0.80.

In the first panel of Figure 10, companionship and love; happiness; and play, fun, and distraction are all combined. The Set B data for extremely high and very high fertility countries supported an upward trend in these combined values, which were lower in salience in these two groups of countries. An upward adjustment due to question format could conceivably have brought these groups to the level of the high fertility countries, though probably no higher. The second panel of Figure 10 shows the salience of the marital bond. Again this value was low in salience in the Set B countries: it was mentioned in only one extremely high fertility country (by 3 percent of the female Akamba) and not mentioned at all in the very high fertility countries. As a result, the correlations across all countries with crude birth rate (Table 5) were substantial, and the correlations with ideal family size were only slightly lower.

Marital Strains

If, in the conjugal family, children are more often evaluated for their impact on personal relationships than they are in the extended or joint family, some of these evaluations will probably be negative.

FIGURE 10 Salience of rewarding interactions values and marital strains at different fertility levels: all countries, single-response percentages



Some people will perceive children as contributing to marital strains rather than reinforcing the marital bond. The disvalue of marital strains was therefore also predicted to rise in salience. It was not, overall, a prominent disvalue. In the VOC countries, its salience never exceeded 7 percent. A slight upward trend was nevertheless observed (Figure 9, last panel). The data for the Set A countries were not inconsistent. The correlations with crude birth rate (Table 6) were slight to moderate. With the Set B countries (Figure 10, third panel), a slight upward trend also appeared. Possibly because of its low salience, however, the patterns for marital strains were not as strongly supportive of the conjugal family factor as the patterns for rewarding interactions values.

Weakening cultural props for high fertility

Cultural props for high fertility are reflected in the links in people's minds between having children and carrying on the family name or enhancing family prestige, fulfilling religious and social obligations, attaining adult status, confirming one's femininity or masculinity, and complying with social expectations. These values attached to children, collectively labelled social benefits, are conferred by society and should be distinguished from the primary-group benefits that come from children providing or reinforcing rewarding interactions within the family. If weakening cultural props contribute to declining fertility, these values should decline in salience as fertility falls. We also reasoned that, if cultural props are indeed effective, the increasing emphasis in some societies on the burdens of overpopulation should be reflected among the disvalues of children. This would be true if the emphasis on overpopulation was not merely a government emphasis but had gained popular acceptance.

Social Benefits

Contrary to prediction, no evidence for a decline in the salience of the family name and family line or religious and social obligations was found with the VOC data. As the shaded bars in Figure 11 indicate, the third social benefit category, adult status and social norms, in fact showed a tendency to increase in salience. The Set A data suggested that there might in fact be some decline, though largely because of a single extreme case, the case of India. The family name and line were exceptionally salient in India, very clearly more salient than in any other country. Religious and social obligations were also mentioned by more respondents in India than anywhere else (with one exception:

husbands in Turkey). And the salience scores for adult status and social norms in India were in the upper range of such scores. Add to this the finding that the family name and religious and social obligations had zero salience in several of the low fertility countries, and Figure 11 seems to show a downward trend in Set A for these values. The correlations (Table 5) only hinted at such a trend, however. With the addition of Set A data, the correlations for the family name did become more positive, but still were only moderate and nonsignificant. The correlations for religious and social obligations were unchanged and about at the same moderate level, and the correlations for adult status and social norms moved from negative closer to zero.

The Set B data seem to bear this out. In the first panel of Figure 12, the family name and family prestige are shown to be highly salient in the extremely high fertility countries but hardly salient at all in the very high fertility countries. A curvilinear trend is a possibility, but cultural variability appears a more likely explanation. The family name may fall in salience at the lowest fertility levels, but at all higher levels the considerable unexplained variance is probably related to cultural factors rather than to development. The second panel of Figure 12, which combines adult status and social norms with religious and social obligations, also shows erratic movements in salience and considerable overlap between groups. The correlation of family name and prestige with crude birth rate was 0.62 (Table 5), but this was smaller in the absolute than the correlation for any other value group except religious and social obligations.

Overpopulation

This last disvalue might be considered a cultural prop for low fertility. It was so low in salience, however, that detecting any trend was difficult (Figures 11 and 12). Overpopulation was mentioned by 1 percent of Malaysian females and Japanese females and by no one else in the Set A or Set B countries. The correlations with crude birth rate were slight.

Mortality reduction

As a factor involved in fertility decline, mortality reduction has complex effects, not all of which appear in value-of-children data. One effect should appear: given higher infant and child mortality, the values attached to having more children should include security against mortality. But this response was not given to the question contrasting some and no children. To the question contrasting many and few chil-

FIGURE 11 Salience of social benefits and overpopulation for Set A countries by sex and for groups of VOC countries

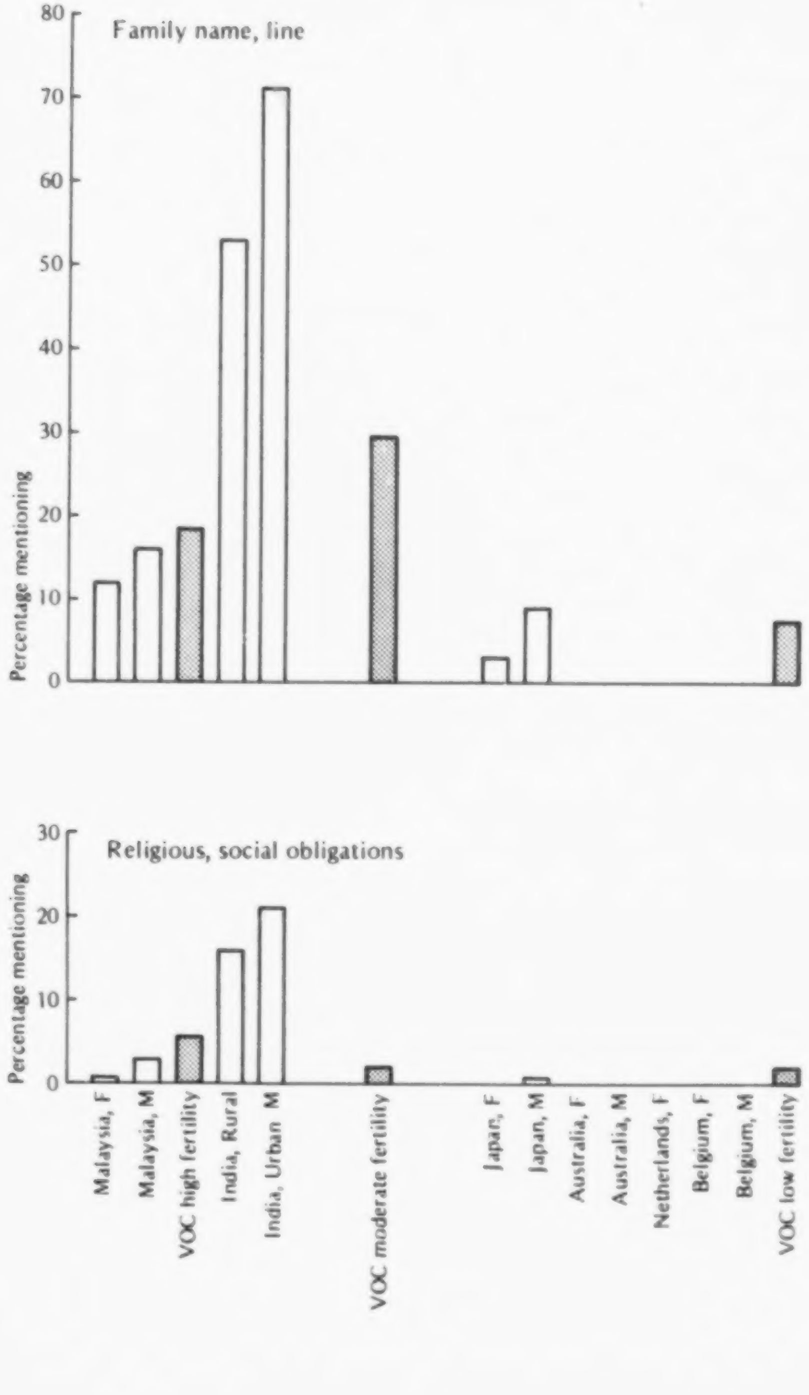
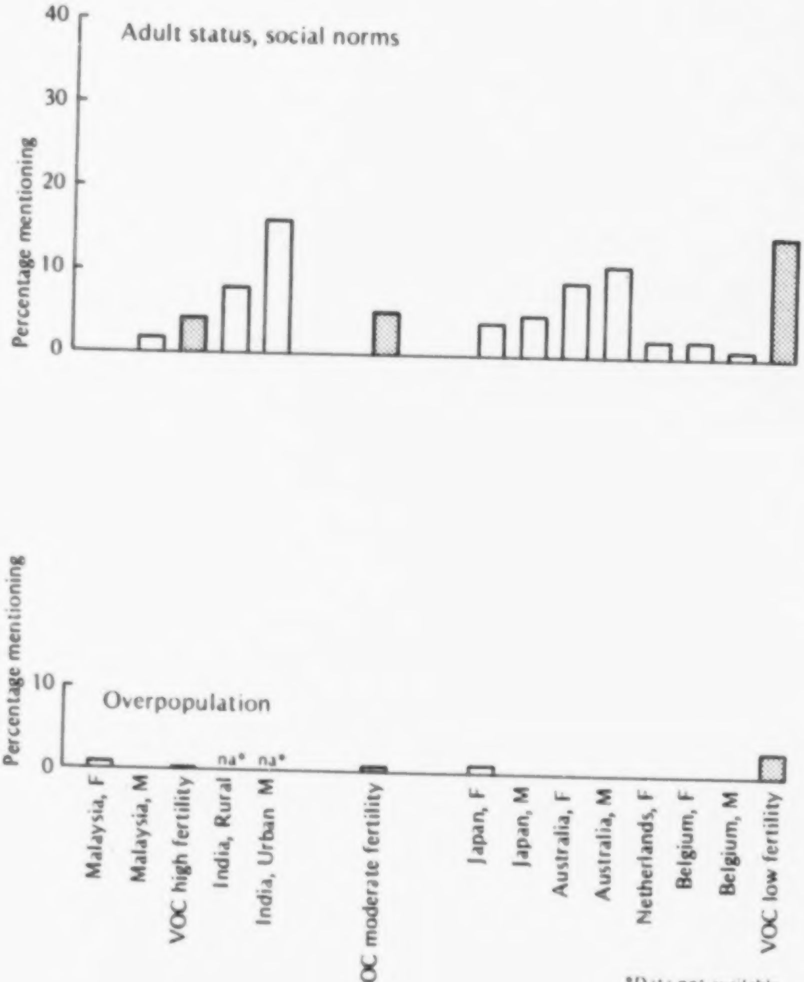


FIGURE 11 *(continued)*

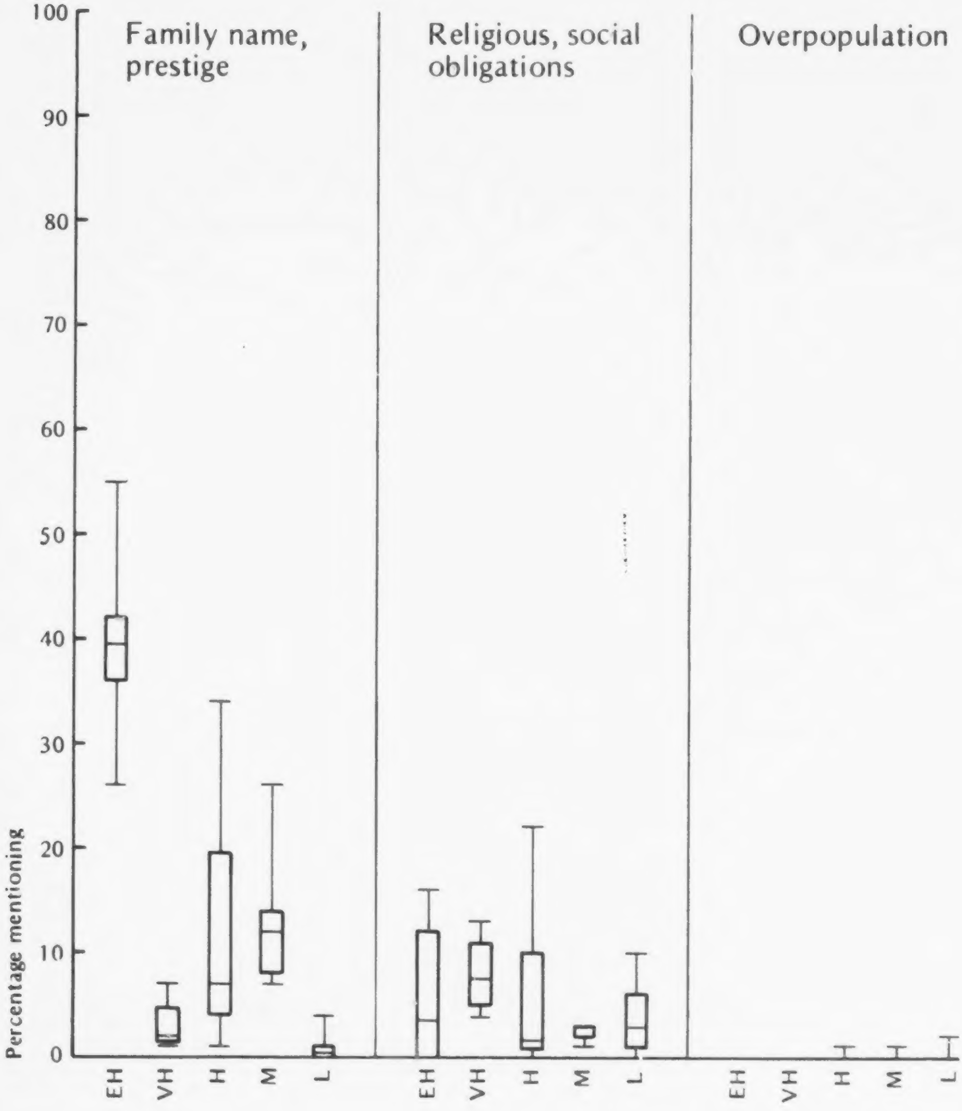


Adult status, social norms

Overpopulation

*Data not available

FIGURE Salience of social benefits and overpopulation at different fertility levels: all countries, single-response percentages



dren, it was generally not given either. An exception was the Thai survey discussed in Appendix B (Table B2), in which some respondents did mention the lack of security against mortality as a disadvantage of a small family. In one Nigerian sample (Table B1), increasing survival chances was mentioned only when the question involved the contrast between 10 and 6 children, and not when many and few or any and no children were contrasted. Previously I noted that concern about mortality risks did appear as a disvalue attached to an only child (Bulatao, 1979:87). The value of security against mortality, therefore, seems to appear at both ends of the continuum, when very small or very large numbers of children are being contrasted. Such contrasts were not used in enough of the surveys being considered here for any trends to be assessed.

Some evidence for the mortality reduction factor was previously adduced from the decline in the salience of the disvalue of child's sickness. The Set A data did not support this decline (Figure 8) and reduced the correlations of child's sickness with crude birth rate.

DISCUSSION

The data considered in this paper, despite their diverse sources, largely reinforce previous findings about the transition in the value of children. Most of the value and disvalue differences previously found among the nine VOC countries and summarized in Table 2 were confirmed with an additional 14 countries covering a broader range of fertility levels and culture areas.

The essential conclusions embodied in Table 2 were that economic benefits from children decline in salience during the fertility transition; that rising aspirations lead to heightened concern about restrictions on parents and greater interest in psychological appreciation values in childrearing; that perceived financial costs and childrearing demands do not vary systematically across fertility levels; that rewarding interactions values increase in salience, reflecting the growing prevalence of the conjugal family; and that values involving cultural props for high fertility show no decline. In broad outline, these conclusions were reinforced.

Some reservations regarding specific value changes shown in Table 2 must be made, however. The first two involve possible nonlinearities, and the latter two involve possible trends where no trend was previously detected. The first reservation involves economic benefits from children, which appeared not to decline but possibly to rise slightly between extremely high and very high fertility levels. Subsequent declines below these levels were clearly supported nevertheless. The second reservation involves the pacing of changes in rewarding interactions values, which were negatively related to fertility. Table 2 indicates a smaller rise in salience for companionship and love, the most prominent of these values, from high to moderate fertility levels and a sharper rise from moderate to low fertility levels. The current data reversed this pattern, indicating a sharper rise earlier in the transition and a leveling off or even some decline later on.

A third reservation pertains to economic costs. The previous conclusion that these costs do not rise in salience was indeed unambiguously supported. Whereas only educational costs were previously observed to actually decline in salience, however, it appears possible, from the current data, that the salience of other financial costs also declines. The final reservation relates to social benefit values, which also showed a possible trend not previously evident. The family name appeared to decline slightly in salience, although its salience was quite variable and cultural differences should not be ruled out as an explanation. Consistent with this possible trend was disconfirmation of the previously observed rise in adult status and social norms.

These conclusions were based on open-ended questions on advantages and disadvantages of having children. It is notable that the coding schemes used for comparing value and disvalue responses across surveys were generally applicable and did allow conclusions to be drawn. Only one important ambiguity in the coding schemes emerged, in the coding of some rewarding interactions values relating to happiness and to play, fun, and distraction, though there were other minor ambiguities attributable to the less differentiated codes used in some surveys. The observations in Table 2 were based not only on the advantages and disadvantages questions but also on other measures, including structured questions, obtained for the VOC countries. The divergences of the current data from these patterns have been stated as reservations, therefore, rather than firm conclusions, and comparisons involving other measures are desirable.

Variations in values and disvalues have been portrayed in this paper as resulting from the modernization or development process and in turn affecting fertility levels. Could the variations have resulted instead from distinctive cultural patterns and practices in different societies? The possibility cannot be ruled out for particular values and disvalues, though it appears unlikely that all the variations would be explained by cultural patterns unrelated to development.[8] Culture and development should probably be seen as competing explanations for particular variations in values, as complementary explanations for other variations. That is, some portion of the variance in values may be jointly explained by culture and by development, other portions separately explained by each of these two factors.

Another possibility is that cultural factors may interact with development stage, producing distinctive value trends in different cultures which are concealed beneath the observed patterns. To test this possibility, one would need either longitudinal data or data on societies that one could safely consider culturally similar. Lacking longitudinal data and lacking any dependable criteria for cultural similarity (one may doubt whether cultures are ever sufficiently similar), one is hard put to test this hypothesis. In fact, I simply rule out the possibility *a priori,* by assuming that societies go through the same basic transition. When the requisite data become available, this assumption can be reconsidered.

How much variance and which specific value differences are explained by cultural factors unrelated to development is important to the argument in this paper. The idea of a transition in the value of children becomes untenable if culture and not development is the major explanation. Culture is unlikely, however, to be the main explanation for variations in the value of children, because this would imply that the observed differences between societies are relatively permanent. It is possible to suggest particular cultural elements that affect specific values. For instance, where there are no family names, children to carry on the family name should not be a value. Where religions do not preach personal immortality, the extension of the self through one's children should be a more important value. A complete theory integrating all such individual insights is lacking, however, as are adequate measures of the variability of the relevant cultural elements across societies. It is not possible, therefore, to evaluate fully the impact of cultural factors. Nevertheless, one may argue that, whatever the impact of culture, it is improbable that culture negates the influence of development on values.

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[8] An important distinction is being made here between culture in general and cultural elements that are orthogonal to development. Development is equivalent to modifying specific cultural elements, and in this sense cultural variability is the complete explanation for variations in values. If development means, among other things, a change in family patterns, this change may be considered a cultural change and culture may therefore be said to be at the root of the resulting value changes. In contrasting the effects of culture and development, however, I am using "culture" more narrowly to embrace only elements for which change is not equivalent to development. The distinction can be tricky. The degree of religiousness or secularism in a society, for instance, should probably be considered development-related and therefore excluded from the ambit of the term culture as used here. But which specific religions are prominent in a society would not be excluded.

CONCLUSION

The conclusions of this analysis may be greatly simplified to bring out their basic coherence. These data indicated that the value-of-children transition takes place somewhat in the following fashion. Initially, the productive capacity of children declines, possibly because of a change in economic structure that reduces children's jobs or possibly because of the development of social prohibitions–legal or otherwise, explicit or implicit, as compulsory education would be–against children working. Whether prohibitions are the original cause or not, norms against child labor eventually become widely accepted. At the same time, or possibly somewhat earlier, children's survival chances improve, and parents more readily make psychological investments in them.

A new image of the child spreads, in which the child is more than just a productive agent but less than an adult, requiring special care and treatment. Interaction with the child, and within the conjugal family generally, is perceived as more pleasurable and becomes more valued. These primary-group values do not sufficiently offset the burdens on parents. With children freed from labor and from contributing to their families while young, parents increasingly are benefactors rather than beneficiaries. The balance between parents and children is upset, and, to restore equilibrium, a contrary trend develops. Parents seek other, largely psychological, satisfactions from raising their children. Higher educational levels support the search for diverse gratifications. Increasingly also parents seek to escape from children, to enjoy personally more of the satisfactions that an expanding economy makes possible.

The early stages of the value-of-children transition, then, involve the liberation of children from premature death and from toil and also involve their being awarded a special, protected status. The later stages of the transition involve the liberation of parents from children, or at least from too many children, and their claiming personal fulfillment as a right.

Throughout this process, short-term trends in the costs of children and fashionable opinions regarding the social importance of having children continue to operate, depressing fertility temporarily at some points and raising it at others. Other cultural differences in the values and disvalues attached to children unrelated to transition stage also continue to operate.

Where, in this process, other fertility-related factors fit has not been determined. Contraceptive availability and delayed marriage play a role in the fertility transition that cannot be teased out from value-of-children data. Other types of data are necessary for examining the effects of these two factors.

Additional data, particularly longitudinal data, would be useful to provide a missing dimension in the evidence. What have been interpreted throughout this paper as changes in values are in fact cross-sectional differences, from which trends are being inferred. Longitudinal data may be very difficult to produce, but historical studies that examine changing family structures and children's rights (e.g., Plumb, 1972; Shorter, 1975; Takanishi, 1978) might serve a similar purpose.

The question of what development factors cause specific changes in values and disvalues of children has not been dealt with here. Much therefore remains to be learned about these changes, but it is already obvious that the process is complex. Beyond the economic transformations that accompany development, the value-of-children transition involves changes in childrearing ideology, in the nature of the family, in people's self-images and expectations, and in many other aspects of the involved and interdependent process of modernization.

APPENDIX A: DATA ON VALUES AND DISVALUES ATTACHED TO CHILDREN

The appendix tables that follow present the basic data for this paper. Table A1 provides information on each of the surveys, which are listed in the order in which they appear in Table 3 (i.e., from extremely high to low fertility). Tables A2 and A3 give multiple-response percentages for values and disvalues for the Set A countries, those countries with surveys closely resembling the surveys in the Value of Children project. Tables A4 and A5 present percentages for the Set B countries, except for four Latin American countries. These data are either single-response or multiple-response percentages, depending on the survey. Tables A6 and A7 cover the remaining four Latin American surveys; each table includes responses to two parallel questions. Table A8 covers all the countries combined, including the VOC countries, and gives single-response percentages for 12 broad categories of values and disvalues. The samples excluded from the analysis, for Iran, Costa Rica, and Chile, are included in these tables.

TABLE A1 Surveys on the advantages and disadvantages of having children

AKAMBA, KENYA	
Question:	"Are there disadvantages in having no children?"
Tabulation:[a]	Single response
Sample:	282 married men and 374 married women aged 20 and above of the Akamba from four locations in the Machakos District in the Eastern Province, interviewed between September 1974 and April 1975
Source:	Kabwegyere (1977:209).
IBO, NIGERIA	
Question:	"What is good in having many children?" "What is good in having few children?"
Tabulation:	Single response to each question
Sample:	624 male and 654 female ever-married Ibos from 19 villages of Arochukwu Division and eight wards of urban Umuahia in Imo State, interviewed in July and August 1974
Sources:	Okore (1975:54, 1977).
YORUBA, NIGERIA	
Question:	Disadvantages of having a large number of children
Tabulation:	Single response
Sample:	202 Yoruba men 17 years of age and above from three villages in the Ekiti Division and six villages in the Ibadan Division of the former Western State, interviewed from December 1974 to June 1975
Source:	Orubuloye (1977:387).

TABLE A1 *(continued)*

WESTERN AND LAGOS STATES, NIGERIA	
Questions:	"The best thing about having many children is . . . ?" "What would be the disadvantages of having ten instead of six?" "What would be the advantages of having ten instead of six?"[b] "What are the bad things about having no children at all?"[b]
Tabulation:	Single responses
Sample:	1,499 Yoruba females and 1,497 Yoruba males 17 years or older chosen in four-stage sampling to represent the Western State and Lagos State, interviewed in June and July 1973
Source:	Australian National University (1974:47, 48, 50, 106–7).
RURAL GHANA	
Questions:	"What are the good things about having a lot of children?" "What are the bad things about having a lot of children?"
Tabulation:	Multiple responses
Sample:	709 households from 28 rural localities scattered throughout the country, interviewed in mid-1963. Respondents were households in that the head of household being interviewed was urged to consult with his wives and other relatives.
Source:	Caldwell (1976:226).
SISALA, GHANA	
Question:	"Why do you value children in Sisala-land?"
Tabulation:	Single response
Sample:	235 male and female adults from the Sisala, partilineal horticulturalists of Northern Ghana, interviewed in summer 1975
Source:	Mendonsa (1977:242).
BARKAIT, BANGLADESH	
Questions:	"What is good about having many children?" "What is good about having fewer children?"
Tabulation:	Single response to each question
Sample:	51 males and 51 females from the village of Barkait in Chandina Thani of Comilla District, interviewed between 1974 and 1976. (Data for 190 other respondents had not been tabulated.)
Source:	Barkat-e-Khuda (1977:695).
SHIRAZ, IRAN	
Questions:	Advantages of large and small families. (Disadvantages of large and small families were also obtained but not used here.)
Tabulation:	Multiple responses
Sample:	61 factory workers and 46 small shopkeepers from the city of Shiraz, interviewed some time between 1974 and 1977
Source:	Mehryar, Tolnay, and Jamshidi (1977:431–32).

TABLE A1 *(continued)*

SIERRA LEONE	
Questions:	"What is the best thing about having many children?" "What is the worst thing about many children?"
Tabulation:	Single response to each question
Sample:	5,952 women aged 15 to 49, either currently married or single but with children, representative of 92 percent of all urban women and 96 percent of all rural women, interviewed in 1969
Sources:	Dow (1971a, 1971b) and unpublished tabulations obtained from the Roper Center.
COLOMBIA	
Questions:	Advantages of a large family, disadvantages of a large family, advantages of a small family, and disadvantages of a small family[c]
Tabulation:	Single response to each question
Sample:	2,737 women aged 15 to 49 living in rural areas or small urban areas (up to 20,000 population) interviewed by the Centro Latinoamericano de Demografia between 1968 and 1969
Sources:	Simmons (1974) and personal communication.
MEXICO	
Questions:	Advantages of a large family, disadvantages of a large family, advantages of a small family, and disadvantages of a small family[c]
Tabulation:	Single response to each question
Sample:	3,000 women aged 15 to 49 living in rural areas or small urban areas (up to 20,000 population) interviewed by the Centro Latinoamericano de Demografia between 1968 and 1969
Sources:	Simmons (1974) and personal communication.
PERU	
Questions:	Advantages of a large family, disadvantages of a large family, advantages of a small family, and disadvantages of a small family[c]
Tabulation:	Single response to each question
Sample:	2,607 women aged 15 to 49 living in rural areas or small urban areas (up to 20,000 population) interviewed by the Centro Latinoamericano de Demografia between 1968 and 1969
Sources:	Simmons (1974) and personal communication.
WEST MALAYSIA	
Questions:	"We want to ask you about the advantages and disadvantages of having children. First, what would *you* think are some of the advantages or good things about having children, compared with not having children at all? Of the advantages you have just mentioned, which advantage do you feel is the more important to you personally?" "Good, what would you think are some of the disadvantages, difficulties, or bad things about having children, compared with not having children?

TABLE A1 *(continued)*

	Of the disadvantages you have just mentioned, which disadvantage do you feel is the more important to you personally?"
Tabulation:	Single response to each question, most important choice
Sample:	About 260 currently married women with at least one child and all of their spouses, 57 percent from rubber and oil palm plantations in Johore state and the rest from urban Kuala Lumpur, interviewed in 1978
Source:	Kee Poo-kong, personal communication.
THAILAND[d]	
Questions:	Advantages of a large family, disadvantages of a large family, advantages of a small family, disadvantages of a small family
Tabulation:	Multiple responses
Sample:	2,960 husbands of women under age 50 included in the Survey of Fertility in Thailand conducted by the Institute of Population Studies, Chulalongkorn University, and the National Statistical Office in 1975 as part of the World Fertility Survey. (More husbands were interviewed, but only those who could be matched with their wives were included in the relevant tabulations.)
Source:	Arnold and Pejaranonda (1977:7, 15).
INDIA	
Question:	Why people in general want children
Tabulation:	Multiple responses
Sample:	Urban: 4,000 male industrial workers from four industries in Ahmedabad and Bombay in Western India and six industries in Jamshedpur and Ranchi in Eastern India, interviewed around 1976; rural: 784 male and 613 female ever-married villagers from six states, interviewed around 1976
Source:	Khan (1977).
COSTA RICA	
Questions:	Advantages of a large family, disadvantages of a large family, advantages of a small family, and disadvantages of a small family[c]
Tabulation:	Single response to each question
Sample:	2,080 women aged 15 to 49 living in rural areas or small urban areas (up to 20,000 population) interviewed by the Centro Latinoamericano de Demografia between 1968 and 1969
Sources:	Simmons (1974) and personal communication.
SANTIAGO, CHILE	
Questions:	"Now we would like to know if you see any advantages (or good things) to having a *large* family? What are these good things?" (disadvantages also coded from this question)
Tabulation:	Multiple responses
Sample:	60 married women and 75 married men from one low-income and one middle-income housing project in Santiago, interviewed in 1973
Source:	Turner (1974).

TABLE A1 *(continued)*

JAPAN

Questions: "I would like to know what you think are some of the good things or advantages about having children, *compared with not having children at all.* These might include the pleasures and benefits you get from having children now and those that you expect in the future. What would you say are some of the good things or advantages about having children, compared with not having children?"

"Now I would like to know about some of the difficulties or disadvantages connected with having children, *compared with not having children at all.* These might include, for instance, various problems or stresses related to raising children, or things that you cannot do or have to give up because you have children. What would you say are some of the difficulties or disadvantages connected with having children, compared with not having children?"

Tabulation: Multiple responses

Sample: 136 wives and 134 husbands from metropolitan Tokyo and 75 wives and 67 husbands from three agricultural prefectures, interviewed in December 1972 and January 1973

Sources: Iritani (1979) and unpublished tabulations.

AUSTRALIA

Questions: Advantages and disadvantages of having children

Tabulation: Multiple responses

Sample: 365 young married women and 352 young married men in Sydney of Australian, Greek, and Italian birth interviewed in 1977

Sources: Callan (1979) and personal communication.

NETHERLANDS

Questions: "Then I want to ask you more about children. Having children has advantages and disadvantages, good sides as well as bad sides. What would you say are the good sides of having children, when you compare it with not having children at all?"

"Even though one is very fond of children, there are, accompanying this, bad sides of having children. What would you say are the bad sides or disadvantages of having children, when you compare it with not having children at all?"

Tabulation: Multiple responses

Sample: 4,522 currently married women whose marriage took place between 1963 and 1973, interviewed in the Netherlands Survey on Fertility and Parenthood Motivation in 1975

Source: Niphuis-Nell (1976:313, 319).

DUTCH-SPEAKING BELGIUM

Questions: Advantages and disadvantages of "having children, as compared with not having children at all"

Tabulation: Multiple responses

TABLE A1 *(continued)*

Sample:	4,877 Dutch-speaking women between 16 and 44 years old and 690 husbands of the women aged 25 to 29, interviewed between July 1975 and May 1976
Sources:	Deven (1977a, 1977b).

NOTE: Surveys for higher-fertility countries are listed first, then surveys for lower-fertility countries. The surveys in the Value of Children project are not included here (except for Japan). For details of the first-phase surveys, see Arnold et al. (1975) and, for the second-phase surveys, see Bulatao (1979).

a To these open-ended questions, some surveys elicited single answers and others elicited several answers. In the latter case, what the researchers reported may, however, have been only a single response, usually the first response. The method of tabulation obviously affects percentages, as is discussed in Appendix C.

b These questions were not used in the main tabulations but only in Appendix B.

c Data for all four questions are reported below, but only data for the first two questions were used in the comparisons.

d Data from this survey were used in Appendix B but not in the main comparisons. The Thai data in the main comparative tables come from the VOC survey.

TABLE A2 Advantages of having children in Malaysia, India, Japan, Australia, the Netherlands, and Belgium

(Percentage mentioning each value[a])

	Malaysia		India		Japan		Australia		Nether-lands	Belgium	
Advantages	Female	Male	Female	Urban male	Female	Male	Female	Male	(female)	Female	Male
Instrumental assistance											
Help in housework	19	6	8	6	2	1	0	0	0	0	0
Help in old age	60	67	59	73	8	6	6	4	10	11	8
Financial, practical help	31	25	16	14	7	6	0	0	0	3	2
Family name, line	12	16	53	71	3	9	0	0	0	0	0
Religious, social obligations	1	3	16	21	0	1	0	0	0	0	0
Adult status, social norms	0	2	8	16	4	5	9	11	2	2	1
Rewarding interactions											
Companionship, love	7	7	2	13	17	18	41	32	34	38	25
Happiness	30	28	8	15	56	52	35	32	14	19	19
Play, fun, distraction	7	7	1	6	7	12	10	21	0	34	37
Marital bond	7	7	1	7	30	25	38	40	24	32	32
Psychological appreciation											
Living through children	7	8	0	0	21	22	14	15	5	10	12
Achievement, power	1	1	5	9	33	27	21	22	29	17	13
Character, responsibility	0	0	0	0	6	9	6	8	0	3	6
Incentive to succeed	1	0	0	1	5	2	4	5	0	16	22
Fulfillment	1	2	6	15	14	10	23	23	34	20	21
Other	16	21	2	1	3	7	0	0	9	6	2
(Number of respondents)	(262)	(272)	(1,397)	(3,385)	(211)	(201)	(365)	(352)	(4,522)	(4,722)	(690)

[a] These percentages have been combined and adjusted by procedures explained in the Measures section and in Appendix C.

TABLE A4 Advantages of having children in Kenya, Nigeria, Ghana,
(Percentage mentioning each class of advantages[a])

	Kenya (Akamba)		Nigeria (Ibo)		Nigeria (Western-Lagos)	
Advantages	Female	Male	Female	Male	Female	Male
Instrumental assistance						
Financial, household help	4	0	19	15	18	19
Help in old age	17	15	15	13	20	18
Family name, heir	41	55	13	15	24	22
Family prestige			24	27	17[d]	21[d]
Religious, social obligations			13	12	2	2
Rewarding interactions						
Companionship, love	0	14	16	18	15[f]	15[f]
Happiness	32	16				
Marital bond	3	0				
Psychological appreciation						
Fulfillment						
Other	3				3	3
No advantages			7	8	36	37
Don't know, no answer			4	4	7	5
(Number of respondents)	(374)	(282)	(654)	(624)	(1,499)	(1,497)

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[a] Percentages are based on total respondents minus those answering "no advantages" or "don't know," except for the "no advantages" and "don't know" rows, which are based on total respondents. Either single responses (one per respondent) or multiple responses (one or more per respondent) were tabulated as indicated in Table A1. A blank cell indicates this category was not used in the particular survey.

[b] Includes aid to society.

[c] Includes support in distress or sickness.

Bangladesh, Iran, Sierra Leone, and Chile

Ghana (Rural)	Ghana (Sisala)	Bangladesh (Barkait)		Iran (Shiraz)		Sierra Leone	Chile (Santiago)	
		Female	Male	Workers	Shopkeepers		Low income	Middle income
49	62[b]	36	22	14	33	19	30	0
31[c]		18[c]	19[c]			50		
	21	24	30	0	8	7		
34	15	3	8					
7		12	16	0	17	13		
7				36	8	4	40[e]	63[e]
	2	6	5			6		
							22	40
							15[g]	12[g]
				64[h]	33[h]			
11		29	22	77	74	6	35	21
	2	6	6			4	11	4
(709)	(235)	(51)	(51)	(61)	(46)	(5,952)	(88)	(47)

d “Social advantages.”

e Includes “moral help” and socioemotional development of children.

f “Large families are a good thing.”

g Includes continuity of name.

h Advantages depend on “ability of parents.”

TABLE A5 Disadvantages of having children in Nigeria, Ghana,
(Percentage mentioning each class of disadvantages[a])

	Nigeria (Ibo)		Nigeria (Yoruba)		Nigeria (Western-Lagos)	
Disadvantages	Female	Male	Rural	Urban	Female	Male
Financial costs						
Cost of education	51	53	74	32	30	31
Other financial costs			15	50	64	65
Childrearing demands						
More work						
Emotional strain	8	10				
Health, pregnancy	3	2			5	5
Discipline			4	9		
Child's sickness						
Insufficient care	39	35				
Restrictions on parents						
Tied down						
Costs to social relationships						
Other			6[e]	10[e]		
No disadvantages	1	2	3	21	11	15
Don't know, no answer	9	8			9	8
(Number of respondents)	(654)	(624)	(100)	(102)	(1,499)	(1,497)

a Percentages are based on total respondents minus those answering "no disadvantages" or "don't know," except for the "no disadvantages" and "don't know" rows, which are based on total respondents. Either multiple or single responses are tabulated as indicated in Table A1. A blank cell indicates this category was not used in the particular survey.

b Includes insufficient care.

Bangladesh, Iran, Sierra Leone, and Chile

Ghana (Rural)	Bangladesh (Barkait)		Iran (Shiraz)		Sierra Leone	Chile (Santiago)	
	Female	Male	Workers	Shop-keepers		Low income	Middle income
11			86	30[b]		74	86
57			79[c]	70[c]	58		
	6	20					
40	13	33	73	28	18	17[d]	68[d]
1					9		
					13		
			8				
	81	47	27			20	27
			27				
					1		
			20	7	4	54	74
					7	11	4
(709)	(51)	(51)	(61)	(46)	(5,952)	(88)	(47)

[c] Includes "everything is easier," which the original investigators paired with "food, clothing, and housing easier to provide."

[d] Includes physical strain.

[e] "Unspecific."

TABLE A8 Advantages and disadvantages of children in all samples, (Single-response percentages[a])

	Advantages				
Fertility level and sample	Economic, practical help	Family name, prestige	Religious, social obligations	Companionship, happiness	Marital bond
EXTREMELY HIGH FERTILITY					
Kenya (Akamba)					
Female	21	41	0	32	3
Male	15	55	0	30	0
Nigeria (Ibo)					
Female	34	37	13	16	0
Male	28	42	12	18	0
Nigeria (Yoruba)					
Rural	u	u	u	u	u
Urban	u	u	u	u	u
Nigeria (Western-Lagos)					
Female	38	41	2	15	0
Male	37	43	2	15	0
Ghana (Rural)	64	26	5	5	0
Ghana (Sisala)	62	36	0	2	0
Bangladesh (Barkait)					
Female	54	27	12	6	0
Male	41	38	16	5	0
VERY HIGH FERTILITY					
Iran[b] (Shiraz)					
Workers	35	0	0	65	0
Shopkeepers	47	13	27	13	0
Sierra Leone	69	7	13	10	0
Colombia	82	2	4	10	0
Mexico	72	2	9	16	0
Peru	83	1	6	9	0
HIGH FERTILITY					
Philippines					
Female	53	1	1	38	3
Male	51	3	0	38	4
Turkey					
Female	42	5	12	26	7
Male	31	9	22	20	6
Malaysia					
Female	65	5	0	22	3
Male	63	7	2	20	3
Indonesia					
Female	62	15	1	17	2
Male	51	24	1	12	4

by fertility level

	Disadvantages					
Psychological appreciation	Financial costs	Emotional strain	Other childrearing demands	Restrictions on parents	Marital strains	Overpopulation
0	u	u	u	u	u	u
0	u	u	u	u	u	u
0	51	8	42	0	0	0
0	53	10	37	0	0	0
u	89	0	4	0	0	0
u	82	0	9	0	0	0
0	94	0	5	0	0	0
0	96	0	5	0	0	0
0	63	36	1	0	0	0
0	u	u	u	u	u	u
0	0	13	87	0	0	0
0	0	33	67	0	0	0
0	69	22	5	4	0	0
0	80	20	0	0	0	0
0	58	18	22	0	0	0
0	71	0	25	2	1	0
0	57	0	33	6	2	0
0	81	0	15	1	2	0
4	25	15	55	4	1	0
4	25	12	59	4	0	0
8	32	12	48	7	1	0
12	59	5	28	7	1	0
3	29	10	44	13	4	1
5	30	12	50	8	1	0
3	24	7	62	7	0	0
7	41	7	50	2	0	0

TABLE A8 *(continued)*

	Advantages				
Fertility level and sample	Economic, practical help	Family name, prestige	Religious, social obligations	Companionship, happiness	Marital bond
HIGH FERTILITY *(continued)*					
Thailand					
Female	75	3	1	16	3
Male	69	10	2	12	3
India					
Rural	48	32	11	4	0
Urban	41	34	9	8	2
Costa Rica	82	1	4	10	0
MODERATE FERTILITY					
South Korea					
Female	19	7	2	44	7
Male	16	12	3	38	9
Chile (Santiago)					
Low income	28	0	0	38	20
Middle income	0	0	0	57	34
Taiwan					
Female	14	14	2	62	4
Male	17	26	3	47	4
Singapore					
Female	14	8	1	65	7
Male	13	12	2	54	13
LOW FERTILITY					
Japan					
Female	7	1	2	42	14
Male	6	4	2	44	12
Australia					
Female	2	0	4	44	20
Male	2	0	5	40	20
Netherlands (female)	6	0	1	32	16
United States					
Female	4	1	7	47	15
Male	4	4	6	40	21
Belgium					
Female	6	0	1	47	16
Male	5	0	0	42	17
West-Germany (Bavaria) (female)	4	1	10	43	13

u—unavailable.

[a] Each respondent is assumed to have given only one response. See the Measures section and Appendix C for an explanation of how percentages were adjusted. Percentages were calculated excluding "no advantage," "no disadvantage," "don't know," and, in the Set A and VOC countries, "other."

	Disadvantages					
Psychological appreciation	Financial costs	Emotional strain	Other childrearing demands	Restrictions on parents	Marital strains	Overpopulation
3	29	7	50	14	0	0
4	41	8	42	9	0	0
5	u	u	u	u	u	u
6	u	u	u	u	u	u
0	66	0	30	1	1	0
21	24	12	44	18	2	0
21	39	9	33	14	4	1
14	69	14	17	0	0	0
9	59	33	8	0	0	0
4	18	42	34	6	0	0
3	28	43	26	3	0	0
5	26	29	29	15	1	0
6	49	23	20	7	1	0
34	10	16	26	45	3	0
32	18	16	29	34	3	0
30	20	18	27	31	4	0
33	26	16	20	33	5	0
45	4	21	13	61	1	0
26	27	10	13	46	3	1
25	35	10	10	41	2	2
30	6	24	33	35	3	0
36	7	23	29	39	2	0
29	5	20	8	67	0	0

b In this case only among the Set B countries, the very frequent "other" response was also excluded in calculating percentages.

TABLE A3 Disadvantages of having children in Malaysia, Japan, Australia, the Netherlands, and Belgium (Percentage mentioning each disvalue[a])

Disadvantages	Malaysia Female	Malaysia Male	Japan Female	Japan Male	Australia Female	Australia Male	Netherlands (female)	Belgium Female	Belgium Male
Financial costs									
Cost of education	9	11	1	2	0	0	0	0	0
Other financial costs	21	21	18	23	37	43	4	8	9
Childrearing demands									
More work	6	2	9	4	12	1	4	12	9
Emotional strain	11	14	28	22	34	28	21	30	26
Health, pregnancy	1	1	0	0	0	0	0	0	0
Discipline	18	24	7	4	15	10	4	9	5
Child's sickness	3	7	19	18	19	18	0	11	10
Worry over child's future	18	20	3	7	10	10	0	9	7
Other childrearing problems	1	0	9	7	0	0	6	5	4
Restrictions on parents									
Tied down	13	9	55	37	45	51	51	40	40
Can't work	1	0	13	9	8	1	5	3	2
Costs to social relationships									
Marital strains	4	1	5	5	9	10	1	4	2
Overpopulation	1	0	1	0	0	0	0	0	0
Other	53	50	16	23	5	8	31	23	28
(Number of respondents)	(262)	(272)	(211)	(201)	(365)	(352)	(4,522)	(4,702)	(689)

[a] These percentages have been combined and adjusted by procedures explained in the Measures section and in Appendix C.

TABLE A6 Advantages of a large family and disadvantages of a small family in Colombia, Mexico, Peru, and Costa Rica, 1968–69
(Percentage mentioning each value[a])

	Advantages of a large family (values provided to parents)				Disadvantages of a small family (values foregone by parents)			
Values	Colombia	Mexico	Peru	Costa Rica	Colombia	Mexico	Peru	Costa Rica
Housework, practical help	61	41	63	61	77	65	82	66
Financial help	21	31	20	21	5	7	7	6
Family name, prestige	2	2	1	1	2	2	1	1
Religious, social obligations	4	9	6	4	4	5	3	11
Companionship, love	10	16	9	10	10	16	7	7
Other	2	2	1	4	2	3	1	8
No advantages	15	16	12	19	47	48	35	49
No answer	4	7	11	6	13	16	29	12
(Number of respondents)	(2,737)	(3,000)	(2,606)	(2,080)	(2,737)	(3,000)	(2,607)	(2,080)

[a] Percentages calculated excluding "no advantages" and "no answer." Percentages for "no advantages" and "no answer" based on total respondents.

TABLE A7 Disadvantages of a large family and advantages of a small family in Colombia, Mexico, Peru, and Costa Rica, 1968–69
(Percentage mentioning each disvalue[a])

Disvalues	Disadvantages of a large family (disvalues incurred by parents)				Advantages of a small family (disvalues avoided by parents)			
	Colombia	Mexico	Peru	Costa Rica	Colombia	Mexico	Peru	Costa Rica
Cost of education	12	5	12	5	11	10	24	11
Other financial costs	59	52	69	61	53	49	53	47
Health, pregnancy	6	7	2	7	2	4	1	2
Child's sickness	1	0	1	2	0	0	0	1
Other childrearing problems	18	26	12	21	24	21	12	32
Tied down	2	6	1	1	5	9	4	2
Can't work	0	0	0	0	0	0	1	1
Marital strains	1	2	2	1	2	4	4	2
Other	2	2	1	2	2	3	2	2
No disadvantages	8	12	20	9	2	2	5	2
No answer	5	7	18	5	4	6	17	3
(Number of respondents)	(2,734)	(3,000)	(2,605)	(2,080)	(2,737)	(3,000)	(2,606)	(2,080)

[a] Percentages calculated excluding "no disadvantages" and "no answer." Percentages for "no disadvantages" and "no answer" based on total respondents.

APPENDIX B: OPEN-ENDED QUESTIONS ON THE VALUE OF CHILDREN–THE CONTINUUM OF CONTRASTS

Open-ended questions about what people value in having children and about the disvalues they perceive in the process are asked in a variety of ways. Some researchers ask about the advantages or disadvantages of having children as opposed to not having children, others about why people prefer many to few children or vice versa, still others about reasons for wanting children or not wanting, say, an only child. In this appendix I argue that each question implies a contrast between different numbers of children. Then I argue that these contrasts fall along a continuum defined by the number of children being contrasted. Finally I examine some data to determine how responses vary across the continuum. The conclusion is that responses do vary, but not radically. Some answers are more emphasized as one moves up the continuum, others more emphasized as one moves down, but generally the same types of responses are expected throughout the continuum.

In some of these questions the contrast is clearly stated. In others it is left implicit. Asked about the advantages of a particular situation, a respondent is implicitly required to contrast it with some other, less advantaged situation. Consider a question about the advantages of "many children." Even if no specific alternative were given, most people would read into the question an implicit contrast between many and few children. If instead someone cited the advantages of having many as opposed to "very many" children, this answer would not be appropriate. Although grammatically correct, it would violate the common understanding of the question.

The contrasts, whether explicit or implicit, in different questions might be seen as points on a continuum, where contrasts are drawn between progressively larger or smaller numbers of children. The idea of such a continuum may be illustrated with data from the survey of Western and Lagos States in Nigeria, part of the Changing African Family project. At different points in the interview three separate questions were asked:

> What would be the advantages of having ten instead of six?
> The best thing about having many children is . . . .
> What are the bad things about having no children at all?

Despite the differences in format–the third question in effect involves two negative ideas–the most important distinction among these questions is the specific contrast being drawn. In the first question, the contrast is explicitly between ten and six children. In the second question, the implicit contrast is between many and few children. In the third question the contrast is between having any children, or at least one child, and having no children. If the idea of a continuum of contrasts is valid, responses should vary in systematic fashion across these questions.

The researchers in the Nigerian study used different coding categories for each question, so that results had to be converted to the uniform coding scheme discussed above. There were differences in responses, and, consistent with the continuum idea, the question contrasting many and few children was intermediate between the other two (Table B1). Contrasting any with no children, only 1 percent said there were no advantages; contrasting many with few children, 36 to 37 percent said there were no advantages; and contrasting ten with six children, 49 to 55 percent said there were no advantages. For those citing advantages, each question elicited the same basic five or six values, though the response distributions

TABLE B1 Responses to three questions on the advantages of children in a survey of Western and Lagos States, Nigeria, 1973

(Percentage mentioning each value)

	Advantages of 10 versus 6 children		Advantages of many versus few children		Advantages of any versus no children	
Values	Female	Male	Female	Male	Female	Male
Instrumental assistance						
Financial, household help	24	26	18	19	0	0
Help in old age	24	18	20	18	16	15
Family name, heir			24	22	36	42
Family prestige	10	19	17[a]	21[a]	7	9
Religious, social obligations			2	2	11	8
Survival chances	24	20				
Rewarding interactions						
Companionship, love	3[b]	4[b]				
Happiness	10[c]	10[c]	15[c]	15[c]	28	24
Psychological appreciation						
Other	5	3	3	3	1	2
No advantages	55	49	36	37	1	1
Don't know, no answer	9	6	7	5	3	1
(Number of respondents)	(1,499)	(1,497)	(1,499)	(1,497)	(1,499)	(1,497)

NOTE: The three questions are, in order: "What would be the advantages of having ten instead of six?" "The best thing about having many children is . . . ." and "What are the bad things about having no children at all?" For the third question, the disadvantages of having no children are considered equivalent to the advantages of having any children and coded accordingly. Percentages are calculated excluding "no advantages" and "don't know." For these two responses only, percentages are based on the total sample.

[a] "Social advantages."

[b] "Social gains (pleasure, etc.)."

[c] "Large families are a good thing."

SOURCE: Australian National University (1974).

varied. Economic help was least mentioned in the any versus none comparison and most mentioned in the ten versus six comparison. Continuing the family name or family line through children, on the other hand, was least mentioned in the ten versus six comparison and most mentioned in the any versus none comparison. Religious and social obligations to have children also got more mentions in the any versus none comparison. The happiness children bring appeared to be mentioned slightly more in the any versus none comparison. For each of these values, the many versus few comparison produced results intermediate between the other two comparisons. The ten versus six comparison elicited one value not obtained with the other questions, the value of increasing survival chances with more children.

These results might be taken as indicative of the changing salience of values across the continuum. The some versus none contrast presumably falls between the many versus few and the at-least-one versus none contrasts. As opposed to the many versus few contrast, the some versus none contrast should therefore produce somewhat fewer responses relating to economic values and slightly more responses relating to family and religious values and to happiness. These differences should be smaller than the differences between the many versus few and the at-least-one versus none contrasts shown in Table B1.

Data from two Thai surveys helped confirm this assumption. Unlike the Nigerian data, these data were from two different samples, although both were designed to be nationally representative. It can be seen in Table B2 that the large family versus small family contrast, equivalent to the many children versus few children contrast, elicited more mentions of economic values than the some versus none contrast. This was the largest difference. It also elicited somewhat fewer responses relating to children providing companionship and happiness and enhancing the marital bond. Differences in regard to family and religious values were slight. It should be noted as well that the large family versus small family contrast elicited responses relating to security against mortality, whereas the some versus none contrast did not.

In addition the Thai data allowed some comparisons of the salience of disvalues. Table B3 shows that the many versus few contrast produced more responses regarding financial costs of children and slightly fewer regarding restrictions on parents due to children. Responses concerning childrearing demands also may be slightly fewer, though differences in coding made comparisons more difficult. Overall, nevertheless, the same set of disvalues was elicited by both contrasts.

It appears that, relative to the some versus none contrast, the many versus few contrast emphasizes both economic benefits and costs and deemphasizes rewarding interactions values (companionship, happiness, the marital bond) and restrictions on parents, while having less effect on other values and disvalues. This finding is consistent with the general idea that children of different parities have different marginal implications for utilities and costs. The appropriateness of particular contrasts is probably related to fertility levels: contrasts between

TABLE B2 Values attached to children elicited by different questions in Thai surveys
(Percentage mentioning each value[a])

Values	Advantages of a large family (values provided) (husbands) Unadjusted	Advantages of a large family (values provided) (husbands) Adjusted[b]	Disadvantages of a small family (values foregone) (husbands) Unadjusted	Disadvantages of a small family (values foregone) (husbands) Adjusted[b]	Advantages of having children (values provided) Wives	Advantages of having children (values provided) Husbands
Instrumental assistance						
Help in housework	16	20	7	13	9	7
Help in old age	45	52	30	46	27	28
Financial, practical help	48	55	18	30	54	51
Family name, line	3	4	11	19	4	13
Religious, social obligations					2	4
Adult status, social norms					0	1
Security against mortality			11	19		
Rewarding interactions						
Companionship, love			5	9	12	5
Happiness	5	6			8	9
Play, fun, distraction					2	2
Marital bond					4	6
Psychological appreciation						
Living through children					2	2
Achievement, power					1	1
Character, responsibility					1	2
Incentive to succeed					1	2
Fulfillment					0	1
Other					4	3
No advantages	22		35			
Don't know	2		5			
(Number of respondents)	(2,960)		(2,950)		(2,234)	(1,176)

[a] Multiple responses were tabulated for each question.

[b] The adjustment was a flog reduction or expansion (see Appendix C) to make the response rates for the columns similar to that for the sixth column.

SOURCES: First and third columns, Survey of Fertility in Thailand, 1975 (Arnold and Pejaranonda, 1977). Fifth and sixth columns, Value of Children project, 1976.

large numbers of children should be more useful in high-fertility settings, contrasts between small numbers more relevant in low-fertility settings.

The Nigerian and Thai data do not indicate radical changes in the salience of

TABLE B3 Disvalues attached to children elicited by different questions in Thai surveys

(Percentage mentioning each disvalue[a])

Disvalues	Disadvantages of a large family (disvalues incurred) (husbands)		Advantages of a small family (disvalues avoided) (husbands)		Disadvantages of having children (disvalues incurred)	
	Unadjusted	Adjusted[b]	Unadjusted	Adjusted[b]	Wives	Husbands
Financial costs						
Cost of education	30	11	37	17	3	4
Other financial costs	69	40	61	34	17	25
Childrearing demands						
More work					3	3
Emotional strain					5	6
Health, pregnancy					3	1
Discipline	5	2	3	1	7	8
Child's sickness					6	4
Worry over child's future					1	1
Other childrearing problems	34	14	33	14	14	11
Insufficient care	5	2	6	2		
Restrictions on parents						
Tied down					6	3
Can't work	1	0	3	1	6	3
Costs to social relationship						
Marital strains					0	0
Overpopulation					0	0
Other					42	42
No disadvantages	4		5			
Don't know	2		2			
(Number of respondents)	(2,955)		(2,958)		(2,236)	(1,163)

a Multiple responses were tabulated for each question.

b The adjustment was a flog reduction (see Appendix C) to make the response rates for these columns similar to that for the sixth column.

SOURCES: First and third columns, Survey of Fertility in Thailand, 1975 (Arnold and Pejaranonda, 1977). Fifth and sixth columns, Value of Children project, 1976.

different values due to varying the contrast from some versus none to many versus few children, but they do indicate some changes in percentages. Quantifying these changes is not possible with these data.

APPENDIX C: ESTIMATING SINGLE-RESPONSE FROM MULTIPLE-RESPONSE PERCENTAGES USING FOLDED LOGS

Open-ended survey questions often elicit more than one answer from a given respondent. There is no standard practice for dealing with such multiple responses. Some researchers code all responses and tabulate them together; others bother only with the first response; still others code patterns of responses, such as "a and b" or "b and c" or "a and b and c." Each practice has its advantages and drawbacks.

The procedure described in this appendix involves converting data treated in one fashion so that it is comparable with data treated in another fashion. Multiple-response percentages are based on numbers of respondents giving particular responses, whether as first, second, third, or later answers. When summed, these percentages should exceed 100 percent. Single-response percentages, on the other hand, are based on numbers of respondents giving a particular answer as their first (and sometimes only coded) answer. These percentages should add up exactly to 100 percent. The procedure here described concerns estimating percentages of one type from the other.

The data on advantages and disadvantages of having children from the Value of Children (VOC) project (nine countries, separate data for wives and husbands in all but one country) will be utilized, because both multiple-response and single-response percentages could be calculated from them. Within each country-sex group, the correlation was calculated across value categories between multiple-response and single-response percentages. These correlations were consistently high. The median correlation was 0.97, and almost all the correlations were above 0.95. It appears likely, therefore, that some simple conversion should give estimates of one set of percentages from the other.

The most obvious conversion would be to multiply each single-response percentage by the mean number of responses given. The problem with this method is that it tends to overestimate the larger percentages and underestimate the smaller ones. Some procedure is desirable that does not increase all percentages proportionally.

It was simpler to estimate single-response from multiple-response percentages than vice versa, as will be explained below. Following Tukey's (1977:498–502) suggestion, I first converted each multiple-response percentage p_m to a folded log (or flog or logit), defined as

$$\text{flog}(p_m) = \tfrac{1}{2} \log_e \frac{p_m}{100-p_m} .$$

To each flog a constant was added, and the number was converted back to a percentage. Zeros were left as zeros and not converted. The constant was chosen so that the resultant estimates of the single-response percentages would total 100 percent. The estimates, therefore, were given by:

$$\hat{p}_s = \frac{p_m e^{2x}}{1-p_m+p_m e^{2x}} ,$$

where x was the constant and was negative.

This procedure (which might be labeled the flog reduction) proved to be quite accurate. The differences between the estimates and the actual single-response percentages were calculated, and the standard deviations of these measures of error are reported in Table C1. Most of the standard deviations were under 3.0. In fact, 69 percent of the estimates were less than one percentage point away from the actual values. The errors also proved to be uncorrelated with the estimates. When all the estimates for advantages for wives were combined, the correlation between these estimates and their errors was −0.05. Similarly, the correlations for advantages-husbands, disadvantages-wives, and disadvantages-husbands were 0.03, 0.21, and −0.03 respectively. Neither larger nor smaller estimates appeared to be biased upward or downward. The errors did show a tendency to increase in absolute size as the estimates increased, although for estimates in the range of 40 to 49 the median absolute error was only slightly above 2.5. It is possible that the errors decrease in absolute size as the estimates pass 50 percent and approach 100 percent, but this could not be verified since only one estimate exceeded 50 percent.

The reverse procedure, estimating multiple-response percentages from single-response percentages (the flog expansion), is equally feasible and should also be quite accurate. But it requires making some assumption about the number of answers the average respondent is likely to give. Going from multiple-response to single-response percentages, on the other hand, one can safely assume that each respondent gives exactly one answer.

Why does the procedure work? The distribution of first answers and later answers must be different. One reason for this may be that specific responses are not repeated, or at least not recorded or coded more than once for each respondent. In that case the most popular responses would be increasingly less likely to be given as later answers, as the probability that they had already been given in-

TABLE C1 Standard deviations of errors of estimates, by country, type of question, and sex

	Advantages		Disadvantages	
Country	Wives	Husbands	Wives	Husbands
Philippines	2.24	2.25	2.45	2.98
Turkey	1.05	1.99	1.88	2.33
Indonesia	1.20	.88	1.90	.86
Thailand	.44	.65	1.15	1.12
South Korea	1.46	1.88	1.87	2.30
Taiwan	1.62	1.39	1.94	2.82
Singapore	2.03	1.65	3.22	4.18
United States	1.66	2.21	3.01	2.49
West Germany	1.39	u	2.53	u

u—unavailable.

creased. It can be shown, however, that this explanation cannot fully account for the observed decline in the percentages giving the more popular responses as later answers. A complementary explanation might be that more popular answers are more likely to take precedence over less popular answers and to be given first.

Whatever the explanation, it appears not to be due to cultural peculiarities, because similar accuracy in the estimates was obtained for data from nine different countries. Whether the procedure would apply to other questions on other topics was not determined. Presumably if the same mechanisms that produced these multiple-response patterns are at work, the procedure should be equally applicable.

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Prediction of family planning and family size from modernity value orientations of Indian women

Bishwa Nath Mukherjee

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Prediction of family planning and family size from modernity value orientations of Indian women

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PREFACE

The research for this paper was conducted pursuant to a contract with the Division of Human Rights, United Nations, and forms part of a larger project entitled Status of Women and Family Planning in India. The author wishes to thank the United Nations and the Council for Social Development for supporting the study. Comments by Rodolfo A. Bulatao and James A. Palmore on an earlier draft of the paper proved most helpful. Also gratefully acknowledged is the editorial assistance of Sandra Ward and Dan Blaine.

ABSTRACT Using data from interviews with 1,865 married women in rural and urban strata of three Indian states, this study evaluates three core dimensions of modernity–subjective efficacy, openness to change, and propensity to plan–as predictors of different aspects of family planning and fertility. Various multivariate techniques are used to analyze the data. Although none of the modernity values were found to predict individual pregnancy rates, they contributed substantially to the prediction of knowledge about and attitudes toward family planning, as well as favorability toward small family size. In urban Tamil Nadu the three modernity values functioned primarily as independent determinants of contraceptive use rather than as intervening variables. In Haryana, they appeared to influence contraceptive acceptance indirectly by operating through respondents' self-perceived status, family planning decision-making power, and attitudes toward small family size. The data also suggest that in the absence of modernity values, favorability toward small family size and power on the part of married women to make family planning decisions may not necessarily lead to adoption of contraception.

INTRODUCTION

This study is based on the premise that family-size limitation is an essential component of a modern low fertility complex, which accompanies the transition from a traditional kinship-dominated society to a modern segmented society (Palmore, 1972; Freedman, Takeshita, and Sun, 1964; Inkeles, 1969). Fawcett and Bornstein (1973) have shown how individual modernity relates to both the modernization process and fertility behavior. In the light of their analysis, such value orientations as subjective efficacy, openness to change, and long-range time perspective that form the core syndrome of individual modernity seem to be useful in predicting married women's knowledge about, attitudes toward, and practice of (KAP) family planning as well as their actual fertility. (See also Clifford, 1971; Inkeles, 1966:141–44.)

Empirical evidence in India supporting this hypothesis is not so strong, although Pareek and Kothandapani (1969) reported a significant correlation between ideal family size and birth control on one hand and some indices of individual modernity on the other. For their study, Pareek and Kothandapani analyzed the Harvard Project data collected in the "tribal belt" of Bihar, in northeastern India (Inkeles, 1966). They found that education, personal modernity, political modernization, overall modernization, and lack of fatalism accounted for about 10 percent of the variance in preference for a small family among 1,300 individuals. George (1972) reported a direct relationship between traditionalism and fertility. Khan and Parveen (1977) also observed a significant relationship between family planning adoption status and subjective efficacy as measured by the number of TAT stories reflecting realistic coping mechanisms (RCM). The majority of their respondents who wrote five or more stories with RCM were early acceptors, whereas nonacceptors mostly ended their stories with unrealistic RCM.

Another dimension of individual modernity that has shown some promise in predicting contraceptive adoption is "internal-external locus of control" (I-E). Carment and Paliwal (1973), for example, found among male workers employed in a large cloth factory in Delhi that internals favored contraception more than externals (cf. MacDonald, 1970). But I-E scores did not differentiate vasectomized and nonvasectomized subjects, possibly because the vasectomized already had more living children than the nonvasectomized and more male than female children. Thus empirical results have not established a direct relationship between locus of control and either fertility or contraceptive adoption, but locus of control may intervene in the relationship between certain socioeconomic factors and family planning attitudes through its effect on favorability toward contraception.

As with most acquired behavioral dispositions, it is reasonable to assume that the I-E dimension intervenes between observable antecedent conditions, such as years of schooling, age, and other sociodemographic factors, and measurable features of reproductive behavior. This dimension also appears to subsume the construct of subjective efficacy, defined as "the respondent's feeling that he is in a position to control his own fate, that he can cope with his present environment, and that it is possible for a man to have an impact on his environment" (Williamson, 1970:331). It has been shown that family planning knowledge and fertility-related behavior are associated with subjective efficacy in India. Williamson demonstrated this with data collected by the Harvard Project. His analysis indicated that in India "subjective efficacy and ideal family size function more as independent determinants of favorability toward birth control than as intervening variables between the social variables and favorability toward birth control" (Williamson, 1970:336).

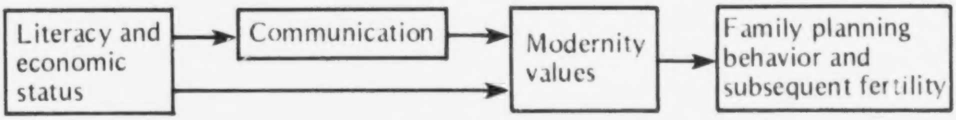
The present study is aimed at verifying part of the above assertion, as well as examining the effects of two other modernity dimensions. Specifically, it examines the importance of subjective efficacy, propensity to plan, and openness to change as predictors of KAP variables. The study was also designed to test the hypothesis that these modernity values are positively related to attitudes toward the small family independent of background and other relevant variables.

Theoretical considerations

The theoretical framework for the above-mentioned hypothesis has been discussed elsewhere (Mukherjee, 1977c). Essentially, the hypothesis is based on the premise that subjective efficacy, openness to change, and propensity to plan constitute important psychological variables that intervene between broader social factors and fertility. The framework argues that differences in the desire for large families result from different kinds and degrees of modernity values, acquired during the process of socialization. According to this model, the sense of subjective efficacy encourages action designed to produce change through self effort and thereby to promote behavior that keeps family size small. The disposition for openness to change helps women to be receptive to the idea of birth control and to appreciate the advantages of a small family. The tendency to plan is likely to facilitate rational planning of such aspects of one's personal life as the number and spacing of offspring.

When these three modernity values are weak or absent, disadvantageous socioeconomic conditions promote high fertility and the birth of a child becomes an unscheduled event. Groat and Neal (1967:946) observed that when the individual feels powerless (inefficacious), "fertility seems likely to constitute an occurrence, a chance happening, an unmanaged event." Morris and Sison (1974) also argued that powerlessness acts as an intervening variable in influencing family size, use of birth control, and selection of contraceptive method. The absence of a strong sense of subjective efficacy and propensity to plan may generate "a type of self-fulfilling prophecy, creating a psychological obstacle to control-relevant behavior" (Neal and Groat, 1970:471). Lack of receptivity to change, similarly, would discourage the acquisition of a small-family norm and reinforce traditional beliefs regarding the value of a large family. An individual who is unreceptive to change is unlikely to adopt contraception for regulating family size.

Modernity values are a coherent psychological syndrome that results from particular processes of socialization, which take place only in particular social settings. Thus urban residence, formal schooling, higher socioeconomic status, greater exposure to mass media, and other advantageous background characteristics facilitate the acquisition of modernity values, which in turn have a dampening effect on fertility. The following paradigm, drawn in part from Lerner (1958) and from Rogers with Svenning (1969:70) was used as the basic conceptual model for the present study:


Literacy and economic status
Communication
Modernity values
Family planning behavior and subsequent fertility

Implicit in the model is the notion that the modernity orientations under study constitute generalized dispositions relevant to fertility motivation and birth control. The predictability of contraceptive adoption as well as family size should be increased by knowledge regarding the individual modernity values. In addition to testing this proposition, the present investigation attempts to study the empirical separability of the modernity variables from background characteristics in differentiating fertility and family planning adoption among six groups of married women.

Research objectives

The study was undertaken to assess the predictability of individual levels of fertility from the variables of subjective efficacy, openness to change, and propensity to plan, which together are believed to form the core dimensions of the modernity syndrome (Smith and Inkeles, 1966:355). The study also considers the extent to which the women's levels of modernity (defined principally by subjective efficacy, openness to change, and propensity to plan) function as intervening variables between adoption of contraception and certain background characteristics of the respondents.

METHOD

The study drew on data from the Status of Women Survey, sponsored by the United Nations, in which 1,872 married women of reproductive age from both rural and urban strata of Haryana, Tamil Nadu, and Meghalaya were interviewed between August and November of 1972. The survey covered three districts each in Haryana and Tamil Nadu and 15 Khasi villages randomly selected from the Bhoi block of Meghalaya and the urban blocks of Shillong town. The selection of Bhoi block and Shillong was based on the rationale that these places have the highest concentration of the Khasi tribe, among whom the culturally ascribed status of women on account of their matrilineal family structure is known to be relatively higher than among other tribal women in Meghalaya. Haryana and Tamil Nadu were chosen because the consistency of the demographic and KAP data obtained from the present survey could be easily checked against the results of two large-scale family planning KAP surveys conducted in these states in 1972 (reported in Mukherjee, 1974a). Because the methodology of the present survey has been described in detail elsewhere (Mukherjee, 1975a and 1975e), only an overview will be presented here.

Sampling procedure

The data were collected through personal interviews. Probability samples were used in each study area. The samples in the rural strata of Haryana and Tamil Nadu were selected by a three-stage method: random selection of three districts, followed by the selection of villages within each district through the Probability Proportionate to Estimated Size (PPES) rule and the cumulative total method (Murthy, 1967:200), and, in the third stage, a linear systematic sampling (Murthy, 1967:156) of a predetermined number of eligible respondents. An eligible respondent was defined as a married woman of 15 to 49 years who was living with her husband and available for the interview at the time of the survey; a woman who had reached menopause, however, even if under age 49, was not considered eligible.

For the urban samples in Haryana and Tamil Nadu, blocks within a district were selected by simple random sampling with replacement. The number of blocks chosen was based on proportionate allocation of the urban population. Twenty eligible women were then chosen by linear systematic sampling from each urban block.

In Meghalaya, 15 of 56 villages from the Bhoi block were selected by means of the cumulative total method, with probability proportionate to the number of eligible women in the entire block. Thirty eligible women were chosen from each selected village by means of simple random sampling without replacement. Two Khasi urban blocks from Shillong, Mawlai and Jawai, were selected randomly; all the eligible women in these two blocks were interviewed. Further details on the sampling design for Meghalaya are given in Mukherjee (1974b).

Of the preselected sample, about 86 percent were successfully interviewed. The original plan was to canvass 2,190 respondents (1,744 rural and 454 urban) for the six study areas, but only 1,872 respondents (1,470 rural and 402 urban) could be interviewed. Data obtained from 115 respondents in the rural areas and from 20 in the urban stratum had to be discarded, however, because they were incomplete in many respects. Thus, the main analysis is based on 1,737 cases (see Table 3). About 9 percent in the canvassed areas could not be contacted in two attempts and 3.5 percent were not contacted even after three attempts. About 1 percent terminated their interviews prematurely. Except for the 14 percent who were not available for interviews, there were no apparent conditions that might have biased the results; the presence of members of the household or neighborhood did not influence the interviews.

Field operations and interview schedule

Interviews were conducted by trained female investigators, all with graduate education in the social sciences. The average interview lasted slightly more than one hour. In each state, a group of four investigators worked as a team.

A structured and precoded interview schedule was developed through item analysis of various scales for measuring modernity values, attitudes toward family planning and small family size, knowledge and use of contraception, respondent's perception of her status at home and in the community, and of her decision-making power, and other social and demographic variables. The interview schedule, which was based in part on the schedule used in the previous Haryana and Tamil Nadu KAP surveys (Mukherjee, 1974a), was pretested after translation. The schedule was further revised and edited after the pretesting in Delhi, Shillong, and Madras.

In its final form, the schedule consisted of 168 precoded questions and scales covering six facets: (1) identification and background information, including the type of communication media used; (2) various aspects of respondent's status; (3) modernity-related attitudes and values; (4) family planning KAP; (5) pregnancy history; and (6) situations that could affect the quality of the interview.

Measurement and index construction

A brief discussion of the various scales and indices developed for the study follows. In each case the psychometric properties of the measures are described. Some of the questionnaire items and scales appear elsewhere (Mukherjee, 1974b, 1974c, 1975b, 1977b).

Core Dimensions of Modernity

The scales used to assess modernity-related attitudes and values focused, as indicated earlier, on three core dimensions of modernity: subjective efficacy, openness to change, and planning propensity.

Subjective efficacy was conceptualized as the belief that the outcome of any action depends on one's effort rather than on sheer luck. In this study the measure of subjective efficacy was based on eight multiple-response questions. Although the subjective efficacy scale is not unidimensional in the Guttman sense, the Kuder-Richardson (K-R) reliability of the scale ranges from 0.65 to 0.80, as shown in Table 1. Possible scores on this scale ranged between 8 and 28. Subjective-efficacy scores showed high correlation with respondents' education, exposure to communication media, household competence, and self-perceived status within the home.

Openness to change was conceptualized as an individual disposition to move from tradition-bound to dynamic ideas, from closed-mindedness to open-mindedness, from pinning faith on traditional authority to independence from authority, from dominant male values to egalitarian values. Seven multiple-choice questions were asked of respondents to measure this modernity value. The index of openness to change was formed by summing scores on the individual seven items, of which three could be scored dichotomously and four in a trichotomous manner. Possible scores on the openness scale ranged from 7 to 18. The reproducibility coefficient ranged from 0.79 to 0.87 (Table 1).

Odd-even reliabilities, based on the split-half total summed scores on both the subjective-efficacy and openness-to-change scales, were higher than the K-R reliabilities in all six study areas. For this reason the summed scores on these two scales, rather than the Guttman scores, were used for all further statistical analyses. The summed scores showed significant positive correlation in all study areas.

To assess *propensity to plan*–i.e., the importance the respondent attached to planning ahead rather than acting on the spur of the moment–four multiple-choice questions were asked. Three questions, adapted from Williamson (1970) were projective in nature. The last one was direct, asking the respondent to rate herself, using a three-point scale, on the extent to which she generally planned ahead. The planning index was formed by summing the scores on these four questions, possible scores ranging from 4 (for weak tendency to plan) to 11.

The four items formed a Guttman scale with a reproducibility coefficient close to 0.90 or above for all six study areas. The uncorrected K-R reliability of the scale ranged between 0.60 and 0.72. The concurrent validity of the planning scale is evident from its significant positive correlation with the scales for both subjective efficacy and openness to change. For other psychometric properties, the reader is referred to Mukherjee (1977b and 1977c).

Indices of Family Planning KAP

Various indices were developed to measure respondents' contraceptive knowledge, attitudes, and behavior; attitudes toward small family size; and perceptions of their own power to make family planning decisions.

To assess the degree of *knowledge* regarding various family planning methods, an index was developed by summing the scores obtained on 13 items. A respondent was asked whether she knew about each of the 13 methods and, if so, if she had ever seen it or knew how the method worked. If the respondent could offer a general description of the method, she was given a score of 1 for that item. If she gave a specific description of the method, she received 2 points. Inability to describe the method produced a score of zero.

Seven items, each dichotomously scored, measured respondents' *attitudes toward family planning* practices in general. No attempt was made to assess attitudes toward specific methods of birth control. Each respondent was asked such questions as "Does family planning improve in general the standard of living?", "Do you think that family planning information should be made available to every married adult?", and "Do you think that the practice of family planning may lead to sexual impotence or frigidity?" Answers to these questions were scored as 1 (unfavorable) or 2 (favorable). Scores on the seven items were summed.

Attitude toward small family size was assessed by asking each respondent to compare large families (of four or more children) with small families (fewer than four) with respect to relative availability of food and clothing, parental love, children's schooling, old-age security, help in the family, income, love among siblings, family peace and harmony, and opportunities for the mother to engage in gainful employment outside the home. Answers favoring a large family received a score of 1; scores of 2 or more were given for answers supporting a small family norm. The scores were summed to form an index of favorability toward small family size, with the highest possible score being 19.

Adoption of family planning was measured by whether the respondent (or her husband) used any modern form of contraception, had been sterilized, had used abortion for birth control, or practiced natural methods of family limitation (withdrawal, abstinence, or rhythm).

Respondents currently using any method were given a score of 3; those who were former users received a score of 2; and those who had never used any method received a score of 1.

Scores on *family planning decision-making power* were based on respondents' estimates of their relative participation, vis-à-vis that of their husbands in making decisions about when to have the first child after marriage, how many children to have, when to have the second child, and whether or not to use birth control methods. Respondents indicated who made the decision in each case. A score of 5 was given for the answer "wife always," 4 for decisions made "jointly by husband and wife," 3 for "husband always," 2 for "mother-in-law," and 1 for "no decision" (i.e., the respondent did not actively participate in the decision-making process). The index of family planning decision-making power was computed by dividing the summed score by the number of items answered. The higher the value of the index, the greater was the wife's decision-making power. (See Mukherjee, 1975b.)

Other Variables

Eleven questions were used to obtain an index of self-perceived *status within the home*. The questions pertained to various privileges and rights of the respondent, such as having a bank account, owning property or land in her own name, maintaining the household accounts, and possessing cash. (For exact wording of the questions see Mukherjee, 1974c.) Each question had three possible answers—"yes," "sometimes," and "no"—in addition to refusal and "don't know" categories. A score of 3 points was given for a "yes" response, 2 points for "sometimes," and 1 point for "no." The sum of the scores (except refusal and "don't know" responses) formed each respondent's score for status within the home.

To assess respondents' views of their *competence in household activities*, they were asked to check whether they knew about the following ten items: child cleanliness, child nutrition, nutrition, dressmaking for children, personal cleanliness, birth control methods, spacing of children, household work, budgeting, and cleanliness of house. The total number of items in which each respondent claimed proficiency was considered an index of her household competence.

Exposure to mass media was measured by asking respondents if they had been exposed during the previous three months to the following sources of one-way communication: radio, films, books, magazines, newspapers, pamphlets, and public meetings. The reported total number of media exposures was used as a gross indicator of each respondent's mass media participation.

An index of *husband-wife communication* regarding family planning was constructed as follows: for a question about how often the respondent discussed family planning, a score of 3 was given for the response "very often," 2 for "sometimes," 1 for "very seldom," and 0 for "never." (For further details, see Mukherjee, 1975d.)

In addition to respondents' household competence, their *educational level* and the number of *modern household items* in their possession were considered to be resource variables. Educational level was measured by years of formal schooling. The household item index was constructed from answers to questions about whether respondents had the following items in their homes: radio, watch, bicycle, metal or wooden chair, electricity, and sewing machine. Possible scores ranged from 0 to 6. Education, household items, and household competence were treated as resource variables both because of their financial and status rewards, and also because they are indicators of opportunities to develop interpersonal and decision-making skills.

Each respondent was asked seven questions designed to measure her *self-perceived status in the community*. The questions concerned whether her neighbors accorded her a general sense of respect, her husband occasionally engaged in arbitration or trouble-shooting work in the community, the respondent was able to secure loans from well-to-do neighbors or local shops if she wished, her family had prestige in the eyes of the local people, neighbors perceived the respondent's family as well-to-do, neighbors ever sought personal advice from the respondent, and neighbors quarreled with the respondent and her husband. Possible answers to each question were "yes," "sometimes," and "no." A score of 3 was assigned for answers denoting a high level of perceived status. Thus scores on this measure ranged from 7 to 21. The trichotomous responses to the seven items formed almost a unidimensional scale in the Guttman sense because the reproducibility coefficient in nearly all the study areas was about 0.86. In rural Meghalaya the reproducibility coefficient was exactly 0.90. The Kuder-Richardson internal consistency reliability of the summed scores ranged from 0.74 to 0.88.

Statistical treatment of data

For the purpose of identifying the crucial variables (predictors) associated with family planning adoption, I employed a stepwise multiple regression analysis (Efroymson, 1960) using the SPSS package (Nie, Bent, and Hull, 1970). The program computes the sum of squares that each independent variable removes, after first adjusting for the effect of every other independent variable. Normally in stepwise regression, independent variables are ranked according to their ability to reduce the variance in the dependent variable that remains at each step of the analysis. In the present analysis, however, the predictors were entered into the equation in order of their presumed relevance to the criterion (family planning adoption), starting mostly with the two modernity variables subjective efficacy and openness to change,[1] one variable per step, until all the predictors had been included in the equation. In a few cases, all three of the modernity values were included in the initial stage of stepwise regression.

I also attempted to partition the percentage of explained variance in family planning adoption status into three orthogonal components: (1) that due to the independent contribution of background or antecedent variables (predictor set A), (2) that due to the independent contribution of the intervening modernity variables (predictor set B), and (3) that due to the joint contribution of the two sets of predictors. In a causal framework, the last term can also be interpreted as the indirect effect of the antecedent factors on the dependent (criterion) variable through the intervening variables. (See Mukherjee, 1977c.)

Assuming certain causal paths to adoption of contraceptives, I assessed the total, direct, and indirect effects of the psychological variables following the decomposition procedure suggested by Alwin and Hauser (1975). In this procedure, the total effect is defined by them as the change in a consequent variable resulting from a given variation in an antecedent variable irrespective of the mechanisms by which the change may occur. The total effect is decomposed into direct and indirect effects. The direct effect is that part of a variable's total impact that is not transmitted via intervening variables, as in the case of indirect effect. As defined by Alwin and Hauser, indirect effects are those parts of a variable's total effect that are mediated by variables specified as intervening between the antecedent variables and the consequent variable.

Another multivariate technique used in the study is canonical correlation analysis, a direct extension of the idea of simple correlation. The technique, which is described in detail in Mukherjee (1978b), was used to assess the overall relationship between three modernity values on one hand and four family planning variables, considered simultaneously, on the other. The purpose was to test the hypothesis that subjective efficacy, planning propensity, and openness to change, as well as certain family planning KAP variables, reflect a common modernity-oriented lifestyle.

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[1] It may be noted that planning propensity was not included in all the analyses reported here.

To summarize the relationship between pregnancy rates and a number of socioeconomic and behavioral variables considered jointly, I subjected the data to a series of multiple classification analyses (MCA). The MCA technique, developed by Andrews and others (1973), is a special form of dummy-variable multiple regression and is applicable to situations in which the independent variables, called predictors, are categorical in nature. It does not call for any assumption regarding the linearity of regression, or about ordering of subcategories of predictors.

RESULTS

The most basic question of this study was whether the modernity variables of subjective efficacy, openness to change, and planning propensity are at all correlated with family planning knowledge and adoption. If these modernity values were found to be significantly related to family planning, the next question was what amount of variance in family planning adoption is explained by subjective efficacy and openness to change alone, and in combination with certain fertility-related variables. Before turning to the empirical findings, let us briefly review the respondents' socioeconomic characteristics.

Respondents' socioeconomic characteristics

More than 70 percent of the women sampled from the rural areas of Haryana and Meghalaya were working outside the home, whereas in Tamil Nadu only 42 percent of the rural respondents were gainfully employed. In the urban strata, the corresponding figures were only about 18, 33, and 44 percent for Haryana, Tamil Nadu, and Meghalaya, respectively.

The highest rate of female illiteracy among respondents in rural areas, 90 percent, was found in Haryana and the lowest, 62 percent, was in Meghalaya. In rural areas of Tamil Nadu the corresponding figure was nearly 77 percent. (In a previous state-level survey conducted in late 1971 in Haryana and Tamil Nadu [Mukherjee, 1974a], Tamil Nadu was found to have a higher literacy rate.)

The average number of modern household items owned by respondents was substantially higher in Haryana than in Tamil Nadu or Meghalaya (Table 2). The Khasi women from rural Meghalaya had on the average not even one modern household item, whereas their urban counterparts had more than three. Although almost 97 percent of the rural respondents in Meghalaya owned their homes, their houses were made of bamboo and asbestos sheets rather than of cement or stones.

TABLE 1 Results of the Guttman scalogram analysis and reliability study of the scales on subjective efficacy and openness to change

	Subjective efficacy						Openness to change					
	Haryana		Tamil Nadu		Meghalaya		Haryana		Tamil Nadu		Meghalaya	
Item	Rural (N=627)	Urban (N=225)	Rural (N=402)	Urban (N=76)	Rural (N=435)	Urban (N=100)	Rural (N=627)	Urban (N=225)	Rural (N=402)	Urban (N=76)	Rural (N=435)	Urban (N=100)
Coefficient of reproducibility	.72	.73	.74	.74	.81	.84	.83	.80	.79	.79	.84	.87
Minimum marginal reproducibility	.61	.65	.62	.65	.75	.84	.76	.73	.73	.72	.81	.85
Proportion of improvement	.11	.08	.12	.09	.06	.00	.07	.07	.06	.07	.03	.02
Jackson plus percentage ratio	.28	.23	.31	.25	.25	.00	.29	.28	.22	.24	.13	.12
Kuder-Richardson reliability[a]	.65	.79	.80	.78	.78	.72	.71	.68	.72	.73	.66	.70
Odd-even reliability[b]	.71	.80	.81	.83	.84	.79	.78	.76	.78	.76	.75	.75

NOTE: Figures in parentheses represent the number of respondents for whom complete data on modernity variables were available for the scalogram analyses.

[a] Internal consistency reliability using the K-R formula 20.

[b] Based on the weighted summed item scores for odd and even items rather than on the total scores for the dichotomously scored items of the scale.

TABLE 2 Mean scores and standard deviations for indices of selected characteristics of respondents

Characteristic	Range of possible scores	Haryana				Tamil Nadu				Meghalaya			
		Rural		Urban		Rural		Urban		Rural		Urban	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Subjective efficacy	8–28	15.01	4.35	17.63	4.35	16.52	4.76	17.84	3.55	17.51	4.25	19.12	2.51
Openness to change	7–18	11.87	2.22	12.88	2.23	10.88	2.74	11.29	2.34	9.63	2.19	9.85	2.05
Propensity to plan	4–11	7.98	2.41	8.52	2.20	7.71	2.20	8.08	1.54	7.85	2.82	8.68	2.59
Lack of desire for additional children	1–2	1.46	0.52	1.64	0.53	1.54	0.52	1.55	0.53	1.18	0.45	1.16	0.40
Family planning knowledge	0–26	8.86	3.77	11.80	5.16	5.85	3.18	7.00	3.92	4.03	4.68	8.15	5.21
Family planning attitude	7–14	10.65	4.05	11.87	2.82	9.07	4.17	10.17	3.53	5.49	3.18	5.68	2.50
Attitude toward small family	9–19	14.58	4.31	16.11	3.38	15.93	3.62	16.58	3.08	11.61	4.30	12.81	3.59
Family planning decision-making power	0–20	7.71	5.28	9.96	5.66	6.30	5.24	7.12	5.37	3.17	2.43	4.32	3.63
Family planning adoption	1–3	1.40	0.90	2.14	1.21	1.30	0.81	1.26	0.82	1.02	0.20	1.11	0.42
Self-perceived status within the home	11–33	18.93	4.08	20.92	4.60	15.48	3.40	16.59	3.77	14.28	3.27	15.81	3.63
Self-perceived status in community	7–21	17.58	3.09	17.35	2.45	14.59	4.73	15.04	3.04	11.51	3.71	12.15	3.03

Almost 17 percent of urban women in Haryana reported that they maintained bank accounts in their names; the corresponding percentages were almost negligible for the other states. Nearly 45 percent of the Haryana respondents reported that they kept cash for day-to-day expenditures, but in Tamil Nadu and Meghalaya the percentages were 18 and 15, respectively. From these findings it appears that the Haryana respondents were economically better off in general, and those from Meghalaya were by far economically more backward, than their counterparts in Tamil Nadu.

Yet compared with urban Haryana, urban Tamil Nadu had a greater percentage of economically active women and a higher level of education on the part of respondents' husbands—both indicators of social development and modernization. The greater degree of modernization in Tamil Nadu may be related to its level of urbanization; according to the 1971 census, nearly 40 percent of the state's population lives in urban areas, whereas only 22 percent of the population of Haryana is urban.

Almost 90 percent of the respondents from Haryana and Tamil Nadu were Hindus. About the same percentage of respondents from Meghalaya were Christians.

The prevalence of family planning adoption, as measured by both current and former use, was found to be greater in Haryana than in Tamil Nadu and least in rural Meghalaya. Even in the urban stratum of Meghalaya, only about 8 percent of respondents had ever used contraception.

In all three states, women's information horizon was still bounded by the village community. Respondents seldom made use of mass media publicizing family planning (Table 2). Nearly 84 percent of the rural respondents of Meghalaya had never been exposed to any mass communication medium; the corresponding percentages were 43 for Tamil Nadu and 52 for Haryana.

Details of other socioeconomic and demographic characteristics of the respondents appear in Table 2 and in Mukherjee (1974c). Intercorrelations among various measures of married women's status are also reported in Mukherjee (1975c), and correlations between various status measures and selected KAP indicators are reported in Mukherjee (1975e).

Modernity correlates of family planning

Relationships between subjective efficacy and selected family planning and fertility-related variables are shown in Table 3. Except for number of pregnancies, number of living sons, and desire for more children, the relationships were generally positive and statistically significant, although their magnitudes were not very large. A similar finding was observed for openness to change and planning propensity.

Knowledge of family planning was positively related to all three of the modernity values in almost all six study areas. Similarly, except in urban Meghalaya, family planning attitude had a significantly positive relationship to all three values. Attitude toward small family size was significantly related to subjective efficacy in all study areas except urban Meghalaya; in both strata of Meghalaya, however, it showed no relationship with openness to change. Propensity for planning correlated moderately in Meghalaya with knowledge and with both of the attitudinal variables. For the three modernity variables under study, there are marked variations in the strength of the correlations across the six samples.

Adoption of family planning showed a significant positive relationship with subjective efficacy only in the urban strata of Haryana and Tamil Nadu, and with openness to change only in urban Tamil Nadu. Since the rate of contraceptive adoption was very low among urban respondents in Meghalaya (about 8 percent), the failure of the two modernity variables to correlate with family planning adoption in this state is not surprising.

Frequency of family planning discussion with husband showed generally positive correlations with both subjective efficacy and openness to change. Although the two modernity variables did not appear to be directly related to fertility control, they did appear to be related to at least one of its determinants.

In Tamil Nadu and in urban Haryana, the greater the level of subjective efficacy, the higher was the ideal age for daughter's marriage. Ideal age for daughter's marriage was significantly related to openness to change, however, only in the rural strata of Haryana and Tamil Nadu. In rural Haryana child marriages are still quite prevalent (Mukherjee, 1973). Planning propensity was found to be positively related to ideal age at marriage only in urban Haryana.

Elsewhere I have reported that both subjective efficacy and openness to change had stronger correlations with small-family attitude than with such socioeconomic variables as respondent's education, employment status, ownership of a house, and number of modern household items in the home (Mukherjee, 1977c). In the urban strata of Haryana and Tamil Nadu the two modernity variables also showed higher correlations with adoption of family planning than with these socioeconomic variables.

TABLE 3 Product moment correlations between three modernity

Modernity variable and study area	Family planning knowledge	Family planning attitude	Attitude toward small family
SUBJECTIVE EFFICACY			
Haryana			
Rural (N=616)	.27*	.22*	.34*
Urban (N=224)	.45*	.40*	.38*
Tamil Nadu			
Rural (N=370)	.19*	.49*	.48*
Urban (N=73)	.26*	.24*	.22*
Meghalaya			
Rural (N=369)	.25*	[illegible]*	.24*
Urban (N=85)	.33*	.11	.02
OPENNESS TO CHANGE			
Haryana			
Rural (N=616)	.19*	.24*	.30*
Urban (N=224)	.32*	.40*	.26*
Tamil Nadu			
Rural (N=370)	.24*	.42*	.48*
Urban (N=73)	.40*	.25*	.19†
Meghalaya			
Rural (N=369)	.17*	.27*	.13
Urban (N=85)	.17†	.05	−.03
PROPENSITY TO PLAN			
Haryana			
Rural (N=616)	.15*	.21*	.13*
Urban (N=224)	.21*	.29*	.26*
Tamil Nadu			
Rural (N=370)	.17*	.38*	.40*
Urban (N=73)	.05	.37*	.32*
Meghalaya			
Rural (N=369)	.57*	.50*	.46*
Urban (N=85)	.49*	.32*	.29*

* Significant at .01 level.

† Significant at .05 level.

variables and selected fertility-related variables

Family planning adoption	Husband-wife communication on family planning	Ideal age for daughter's marriage	Desire for more children	Number of pregnancies	Number of living sons
.12	.16*	.08	−.06	−.01	.04
.23*	.20*	.22*	−.08	−.04	−.04
.10	.38*	.16*	−.12	.04	.09
.39*	.16	.23*	−.03	−.09	−.13
.05	.13	.00	−.03	.03	.04
.07	.18	−.06	−.08	.09	.10
.05	.10	.26*	−.03	−.06	−.04
.15	.17*	.14	−.01	−.04	−.07
.12	.27*	.15†	−.16*	.06	.06
.39*	.20†	−.17	−.14	.17	.04
−.07	−.10	.06	.01	.08	.04
−.09	.13	−.06	−.28*	.07	.03
.22*	.07	.07	−.04	−.05	.00
.23*	.10	.21*	−.02	−.08	−.01
.16*	.16*	.12	−.13	.03	.04
.15	.06	.09	−.07	.01	−.16
.04	−.01	−.10	−.03	.04	.03
.06	.01	−.10	.03	.05	.07

Certain consistencies within states are noteworthy. For example, in both strata of Haryana the best single predictor of family planning knowledge was subjective efficacy, but in Tamil Nadu it was openness to change and in Meghalaya it was planning propensity. Propensity to plan also emerged as the best single predictor of the two attitudinal variables in Meghalaya as well as in Tamil Nadu. In Haryana, subjective efficacy appeared to be the best single predictor of small-family attitude while openness to change best predicted attitude toward family planning. In rural Tamil Nadu all three modernity variables were roughly equal in importance for predicting attitude toward small families. In rural Haryana and rural Tamil Nadu, planning propensity was the best single predictor of family planning adoption. In the urban stratum of both Haryana and Tamil Nadu, subjective efficacy appeared to be the best single predictor.

Overall relationship between modernity and KAP variables

To investigate further the overall relationship between modernity values and the four family planning variables, a canonical correlation analysis was run between all three modernity variables and the family planning variables. The results generally supported the earlier analysis. However, certain interesting patterns of relationships not previously apparent emerged. For example, the canonical analysis revealed that in Haryana, both subjective efficacy and openness to change were related to family planning knowledge and attitude and to attitude toward small family size. Propensity to plan was related to adoption. In rural Tamil Nadu subjective efficacy and openness to change were related essentially to family planning attitude, whereas in urban Tamil Nadu they were strongly related to adoption. In the latter area, the best linear association between the modernity variables (predictor set) and the family planning variables (criterion set) occurred when the criterion set was so weighted that it involved a large amount of adoption and a moderate amount of contraceptive knowledge and attitude. Thus in urban Tamil Nadu the four family planning variables seemed to cohere, reflecting cognitive, attitudinal, and behavioral consistency.

Predictability of family planning from modernity

Table 4 shows percentage of variance in selected fertility-related correlation variables accounted for by the three modernity variables combined. The modernity variables appeared to be quite satisfactory for predicting knowledge and attitudes in all study areas but, except in urban Tamil Nadu, not very satisfactory for predicting family planning

TABLE 4 Percentage of variance in selected fertility-related variables explained jointly by subjective efficacy, openness to change, and propensity to plan

Fertility-related variable	Haryana		Tamil Nadu		Meghalaya	
	Rural	Urban	Rural	Urban	Rural	Urban
Family planning knowledge	9.1	22.4	6.9	17.5	32.7	27.4
Family planning attitudes	10.0	22.9	31.6	21.1	27.2	10.3
Attitude toward small family	16.2	16.8	34.3	15.8	22.2	10.1
Family planning adoption	5.2	8.2	3.1	23.6	2.0	1.2

NOTE: Percentage of variance explained equals $R^2 \times 100$.

adoption. Interestingly, family planning adoption in urban Tamil Nadu turned out to be relatively the most predictable criterion of all the four family planning KAP variables listed in Table 4.

We now focus on family planning adoption, using a recursive causal model in which openness to change is determined by subjective efficacy, the two dispositions are postulated to influence planning propensity, and these three modernity values in turn affect adoption status. These causal directions assumed, the direct effect of subjective efficacy and its indirect effect on adoption as mediated through the other two modernity values can be determined by the procedure described in Alwin and Hauser (1975). The total effect on adoption and its direct and indirect effects are shown separately for each study area in Table 5, which also shows the direct and indirect effects of openness to change on adoption.

It is seen from Table 5 that subjective efficacy and openness to change had equal direct effects on adoption in urban Tamil Nadu, but the magnitude of their indirect effects differed substantially. Subjective efficacy had a total effect of .39 on adoption, whereas openness exerted only .28 total effect. Of the .39 total effect, the indirect effect of subjective efficacy was .11. Over 90 percent of the indirect effect of subjective efficacy on adoption was mediated through openness to change.

In rural Tamil Nadu also, the indirect effect of subjective efficacy on adoption was largely mediated by openness. In rural Haryana, however, the indirect effect was mediated largely through planning propensity rather than openness. It appears that in this study area married women with a strong sense of efficacy tended to attach importance to planning and that this value encouraged them to adopt contraception for limiting family size.

Modernity compared with socioeconomic predictors

To determine whether modernity values intervened between background characteristics and contraceptive adoption as postulated, a number of first-order partial correlations were computed. In each case, the effect of a particular modernity value was statistically held constant when determining the relationship between the background characteristic and adoption. In most cases, the value of the partial correlation was substantially reduced, thereby providing evidence that the particular modernity value in question did have an intervening role. For example, the competence index for the Tamil Nadu urban stratum correlated positively and significantly ($r = .23$) with adoption. With openness to change controlled, the first-order partial correlation turned out to be about .15, which is not significant at the .01 level.

The amount of variance accounted for by different combinations of the modernity and five background variables (respondent's age, number of pregnancies, education, modern household items, and household competence) is presented in Table 6. Part of the total variance in adoption explained by subjective efficacy and openness to change is due to their correlation with the five background variables, which also had an effect on family planning adoption. Not all the variance in the modernity variables can be explained by the five background variables, however. Even after the five background variables are included in the multiple regression equation, it is possible to increase the percentage of variance explained by adding the modernity variables to the equation. The difference between the percentage of variance explained by both background and modernity variables (row 1 of Table 6) and that explained by the five background variables alone (row 3) provides an estimate of the incremental variance explained by the two modernity variables alone (row 5). The incremental variance due to the two modernity variables can be used to assess the extent to which these variables functioned as independent determinants of family planning adoption.

Both the total (row 2) and incremental (row 5) variance accounted for by the modernity variables were substantial only in urban Tamil Nadu. In urban Haryana subjective efficacy and openness to change explained nearly 6 percent of the total variance in family planning adoption, but only about one-sixth of this contribution could be explained solely by the two modernity measures independent of the background variables.

TABLE 6 Percentage of variance in contraceptive adoption explained by selected modernity and background variables

	Haryana		Tamil Nadu		Meghalaya	
Row and predictor	Rural	Urban	Rural	Urban	Rural	Urban
1 Subjective efficacy, openness to change, age, number of pregnancies, education, household items, and household competence	7.9	22.2	8.8	30.4	3.3	7.9
2 Subjective efficacy and openness to change (modernity variables)	1.6	5.7	2.1	22.2	1.8	0.9
3 Age, number of pregnancies, education, modern household items, and household competence (background variables)	7.6	21.3	6.8	13.3	1.3	7.1
Direct effect of:						
4 Five background variables (row 1 minus row 2)	6.3	16.5	6.7	8.2	1.5	7.0
5 Two modernity variables (row 1 minus row 3)	0.3	0.9	2.0	17.1	2.0	0.8
Indirect effect of:						
6 Background through modernity variables (row 3 minus row 4)	1.3	4.8	0.1	5.1	−0.2	0.1

Thus only in urban Tamil Nadu did subjective efficacy and openness to change function more as independent determinants of adoption than as intervening variables. In four other study areas, the contribution of these modernity measures even as intervening variables was negligible. In urban Haryana, however, the modernity variables appeared to function more as intervening variables than as independent determinants. This can be seen by subtracting the incremental variance explained by the background variables (Table 6, row 4) from the total variance accounted for by these variables (row 3). The subtraction indicates the extent to which the psychological predictors functioned as intervening variables between the background variables and adoption. The values in row 6 of Table 6, which correspond to the percentages of variance explained by the intervening effects of the background variables through the modernity variables, are quite small, ranging from 0 percent in Meghalaya to about 5 percent in the urban strata of Haryana and Tamil Nadu. In none of the study areas was the percentage of variance explained by the effects through the intervening modernity variables greater than that explained by the independent effects of the background variables.

A comparison of the fifth and sixth rows of Table 6 shows whether the two modernity variables functioned more as independent determinants of adoption than as intervening variables. Only in Haryana did they function more as intervening variables.

The first and second rows of Table 7 give the partial regression coefficients in standard form (beta weights) for the multiple regression equation that includes only subjective efficacy and openness to change as predictors. The last panel of Table 7 gives the beta weights for the equation that also includes five background variables (two demographic and the three resource variables of education, household competence, and modern household items owned) in addition to the two modernity variables. Only in urban Tamil Nadu do the modernity variables emerge as significant predictors even after the effects of the five background variables have been statistically held constant. It is noteworthy that in rural Meghalaya openness to change contributed *negatively* to family planning adoption; the beta weights suggest that for optimal linear prediction of family planning adoption, the score for openness to change should be negatively weighted. In urban Meghalaya also, openness to change should be negatively weighted (see bottom panel of Table 7). The score for education should be weighted negatively by much more (–.18), however, than that for openness to change (–.09), as can be seen from the last panel of Table 7. Nevertheless, in both cases the corresponding regression coefficients are not statistically significant even at the .05 level.

The negative weighting on openness to change is statistically significant at the .01 level in the Meghalaya rural stratum. This finding suggests that in rural Meghalaya women who were more open to change were less likely to adopt contraceptives than women who were not open to change. The result casts doubt on the construct validity of the index of openness to change, but it is consistent with findings reported by Prachuabmoh (1967) indicating that in Thailand more modern women, regardless of their current fertility, tended to want additional children more often than their less modern counterparts.

The second panel of Table 7 gives the betas for the equation that

Household competence	0–10	7.83	1.78	8.83	1.35	7.13	2.87	7.34	1.91	7.20	3.71	7.78	1.40
Modern household items	0–6	1.66	1.78	4.04	2.03	0.83	1.39	2.24	1.89	0.61	1.13	3.36	1.19
Educational level	0–22	1.35	1.18	3.70	3.05	1.73	1.53	2.78	2.08	1.75	1.35	6.13	2.88
Media exposure	0–7	0.74	1.01	2.39	2.07	1.04	1.25	1.93	1.88	0.30	0.84	2.96	2.33
Husband-wife communication on family planning	0–3	0.95	1.16	1.50	1.23	0.50	0.87	0.55	0.89	0.41	0.69	0.56	0.83
Number of restrictions imposed	0–11	5.54	2.53	3.88	2.76	4.07	2.72	4.20	2.55	4.16	3.13	4.74	3.24
Number of pregnancies	na	4.75	3.18	4.54	3.00	3.52	2.11	3.51	2.56	5.01	2.89	3.83	2.10
Number of living sons	na	1.77	1.58	1.83	1.45	1.28	1.25	1.50	1.36	1.83	1.44	1.75	1.29
Number of living daughters	na	1.51	1.36	1.42	1.34	1.25	1.57	1.30	1.41	1.83	1.53	1.56	1.26
Respondent's age	na	29.98	7.83	31.54	7.48	29.02	6.76	29.68	7.07	30.81	7.16	29.93	5.45
Ideal age for daughter's marriage	na	16.02	2.26	18.59	4.11	17.52	2.82	18.00	2.81	19.72	2.27	21.03	3.17

SD—standard deviation.
na—not applicable.

TABLE 5 Partitioning of effects of subjective efficacy and openness to change on contraceptive adoption

	Beta weights for predicting adoption from						Indirect effect via	
Study area and variable	Efficacy	Efficacy + openness	Efficacy + openness + planning	Total effect	Direct effect	Indirect effect	Openness	Planning
Rural Haryana								
Efficacy	.12	.11	.07	.12	.07	.05	.01	.04
Openness		.02	−.01	.02	−.01	.03		.03
Planning			.20	.20	.20			
Urban Haryana								
Efficacy	.23	.20	.17	.23	.17	.06	.03	.03
Openness		.07	.02	.07	.02	.05		.05
Planning			.17	.17	.17			
Rural Tamil Nadu								
Efficacy	.10	.04	.03	.10	.03	.07	.06	.01
Openness		.09	.06	.09	.06	.03		.03
Planning			.13	.13	.13			
Urban Tamil Nadu								
Efficacy	.39	.29	.28	.39	.28	.11	.10	.01
Openness		.28	.28	.28	.28	.00		.00
Planning			.12	.12	.12			
Rural Meghalaya								
Efficacy	.04	.09	.07	.04	.07	−.03	−.05	.02
Openness		−.12	−.13	−.12	−.13	.01		.01
Planning			.05	.05	.05			
Urban Meghalaya								
Efficacy	.04	.07	.05	.04	.05	−.01	−.03	.02
Openness		−.08	−.10	−.08	−.10	.02		.02
Planning			.07	.07	.07			

NOTE: The indirect effect of subjective efficacy on adoption as mediated through openness to change is obtained by subtracting the beta weight of efficacy in the predictor set for efficacy + openness from the corresponding weight for efficacy alone. Similarly, the indirect effect of efficacy through planning propensity is estimated by subtracting the weight for efficacy in the predictor set for efficacy + openness + planning from the corresponding weight in the set consisting of efficacy + openness. Source of procedure is Alwin and Hauser (1975).

TABLE 7 Beta weights in the prediction of contraceptive adoption, using selected sets of predictor variables

	Haryana		Tamil Nadu		Meghalaya	
Predictor set	Rural	Urban	Rural	Urban	Rural	Urban
Subjective efficacy	.11*	.20*	.04	.29*	.09	.07
Openness to change	.02	.07	.09	.28*	−.12	−.08
Subjective efficacy	.06	.16*	.00	.22*	.02	.11
Openness to change	−.01	.00	.05	.27*	−.10	−.10
Status within home	.22*	.20	.16*	.17	.16*	−.06
Subjective efficacy	.02	.01	−.04	.23*	.00	.10
Openness to change	−.03	−.02	−.04	.22*	−.11*	.01
Family planning knowledge	.14*	.28*	.12*	.05	.07	.02
Attitude toward small family	.01	.08	.07	.03	.02	.09
Status within home	.18*	.13	.17*	.14	.16*	−.04
Desire for no more children	.21*	.27*	.27*	.22*	.05	.41*
Subjective efficacy	.06	.11	.05	.30*	.07	.07
Openness to change	.00	.00	.11	.22*	−.14*	−.09
Age	.09	.02	−.22*	.01	−.02	−.00
Number of pregnancies	.09	.16	.30*	.27*	.01	.14
Household competence	.16*	.26*	.12*	.03	.05	.10
Modern household items	.08	.20*	−.00	.02	.09	.08
Education	.04	−.06	−.06	.11	.04	−.20†
Subjective efficacy	.00	.12†	−.04	.23†	.11*	.03
Openness to change	−.08	−.03	.12†	.28*	−.13*	−.09
Household competence	.25*	.26*	.08	.19	.08†	.03
Modern household items	−.01	.18*	.00	.08	.02	.05
Education	−.07†	.24†	−.08	.07	−.10†	−.18
Media exposure	.09†	.07	−.03	−.15	.04	−.01
Husband-wife communication	.05	.12†	.07	−.18	.22*	.19†
Status within home	.25*	.13†	.15*	.22	.15*	−.03
Status in community	−.18*	−.07	−.13*	−.02	−.18*	.04
Family planning decision-making power	.27*	.06	.25*	.17	.41*	.22*

* Significant at .01 level.

† Significant at .05 level.

includes the measure of self-perceived status within the home. The third panel presents the beta weights for the equation that includes the four fertility variables of family planning knowledge, attitude toward small family size, desire for no more children, and perceived status at home, in addition to the two modernity variables. In urban Tamil Nadu as well as in both strata of Meghalaya, the results are basically the same for the equation representing the two modernity variables as for the equation incorporating the four fertility variables. In other words, the two modernity variables maintained the same relationship to family planning in urban Tamil Nadu even after being included in the set with four other predictors. Similarly, in both strata of Meghalaya, the two modernity variables produced similar results when used alone and in conjunction with the other four variables in predicting adoption.

In the case of urban Haryana, subjective efficacy still contributed after being included in the set consisting of status, openness, and subjective efficacy, as can be seen from the second panel of Table 7. However, the influence of subjective efficacy was completely washed out when it was included in the set of four fertility-related variables. The result was the same in both the rural and the urban strata of Haryana, as can be seen from the third panel of Table 7.

Thus the regression analysis can be summed up by the finding that only in urban Tamil Nadu did the two modernity variables continue to show predictive efficiency in the presence of the four fertility-related variables (panel 3 of Table 7). Both of the modernity predictors had more or less the same predictive efficiency. In Meghalaya they contributed very little. In Haryana, subjective efficacy was found to be effective in predicting adoption before being combined with four other fertility-related measures; when combined, its effect was eliminated, as can be seen from the third panel. The regression coefficients for knowledge of family planning and lack of desire for additional children were found to be statistically significant at the .01 level only when these two predictors were included with the other four in the analysis for urban Haryana. In rural Haryana and Tamil Nadu the regression coefficient for status within home was also found to be statistically significant at the .01 level.

As we saw in Table 6, except in urban Tamil Nadu the two modernity variables did not emerge conspicuously even as intervening variables. Table 8 shows that the indirect effect of self-perceived status through the two modernity variables was relatively high and quite substantial (about 7 percent) only in urban Tamil Nadu. In Meghalaya,

TABLE 8 Percentage of variance in contraceptive adoption explained by modernity and fertility-related variables

Row and predictor	Haryana		Tamil Nadu		Meghalaya	
	Rural	Urban	Rural	Urban	Rural	Urban
1 Subjective efficacy, openness to change, and status within home	5.9	8.8	3.3	24.8	3.1	2.0
2 Status within home	5.6	6.6	3.3	9.6	2.1	1.1
3 Subjective efficacy and openness to change (modernity variables)	1.6	5.7	2.1	22.2	1.8	0.9
Direct effect of:						
4 Status alone (row 1 minus row 3)	4.3	3.1	1.2	2.6	1.3	1.1
5 Two modernity variables (row 1 minus row 2)	0.3	2.2	0.0	15.2	1.0	0.9
Indirect effect of:						
6 Status through modernity variables (row 2 minus row 4)	1.3	3.5	2.1	7.0	0.8	0.0
7 Status within home, family planning knowledge, small family attitude, desire for more children, and two modernity variables	13.2	24.5	13.5	30.2	4.0	21.1
8 Status within home, family planning knowledge, family planning attitude, and desire for more children	12.2	24.1	12.1	13.0	3.2	20.0
Direct effect of:						
9 Two modernity variables (row 7 minus row 8)	1.0	0.4	1.4	17.2	0.8	1.1
10 Fertility variables (row 7 minus row 1)	7.3	15.7	10.2	5.4	0.9	19.1
11 Status within home, family planning knowledge, attitude toward small family, and no desire for more children (row 7 minus row 3)	11.6	18.8	11.4	8.0	2.2	19.2
Indirect effect of:						
12 Above four predictors through two modernity variables (row 8 minus row 11)	0.6	5.3	0.7	5.0	1.0	0.8

the modernity variables did not have any intervening role. Status alone emerged as an independent determinant of family planning adoption in most study areas, but its direct effect was greater in Haryana (row 4, Table 8) than in the other states.

Modernity compared with fertility-related variables as predictors

The prediction of family planning adoption was considerably improved when the predictor set included, in addition to the two modernity variables, four fertility-related variables (row 7, Table 8). The percentage of explained variance (square of the multiple correlation multiplied by 100) increased, for example, from 2 to 21 in the case of urban Meghalaya, as can be derived from rows 1 and 7 of Table 8. The coefficient of determination increased from only .03 to .04 in urban Meghalaya, however. In the other study areas, the corresponding coefficient with the fertility-related variables included ranged from .13 to .30.

The difference between the proportion of variance in family planning adoption explained by four fertility-related and two modernity variables (row 7, Table 8) and that explained by the two modernity variables alone (row 1) provides an estimate of the increment in proportion of variance explained by the four fertility variables alone (row 10). The independent contributions of the four fertility variables were quite substantial and much greater than their effects through the intervention of the two modernity variables (row 12).

The results reported in Table 8 further substantiate the earlier conclusion that modernity values did not function as intervening variables. Here they did not appear to be important as intervening variables even in mediating the indirect effects of fertility-related variables on family planning adoption.

Table 9 presents the beta weights corresponding to the regression results in Table 8. The set of predictor variables used is slightly different from that in Table 7. With this set of variables, the modernity variables have unpredictable effects on contraceptive adoption. Planning propensity, particularly, has a substantial negative effect on adoption in Meghalaya.

Prediction of small-family attitude from modernity variables

Although subjective efficacy, propensity to plan, and openness to change were found to be virtually useless in predicting family planning adoption except in urban Tamil Nadu, they could account alone for substantial variance in small-family attitude in four of the six study

TABLE 9 Beta weights in the prediction of contraceptive adoption, using modernity values and fertility-related variables as predictors

	Haryana		Tamil Nadu		Meghalaya	
Predictor variable	Rural	Urban	Rural	Urban	Rural	Urban
Subjective efficacy	−.02	.01	−.08	.22†	.15*	.10
Openness to change	−.08	−.13†	.07	.06	−.14†	.13*
Planning propensity	.08*	.09	.08	−.10	−.39*	−.60*
Household competence	.09	.22*	.07	.07	.19*	.27*
Modern household items	.00	.09	−.02	.10	.00	.35*
Education	−.10*	−.09	−.09	.16	−.16*	−.04
Media exposure	.11*	−.06	−.04	−.55*	.03	−.61
Husband-wife communication	.09*	.15*	.03	−.23†	.31*	.32
Status within home	.18*	.05	.13*	.06	.30*	−.30
Status in community	−.09	.06	−.11†	.29	−.26*	−.43†
Family planning decision-making power	.12	−.11	.24*	.09	.37*	.28*
Family planning knowledge	.12*	.13†	.12*	.37†	.20*	.58*
Family planning attitude	.16*	.30*	.09	.25	.24*	.27*
Attitude toward small family	−.07	.01	.01	.07	.01	.20†
Ideal number of sons	.03	−.04	.05	.00	.14*	.16
R^2	.18	.32	.14	.38	.31	.16

* Significant at the .01 level.

† Significant at the .05 level.

areas. Table 10 shows their beta weights in a regression equation for predicting small-family attitude that comprised three other variables as well. The beta weights reveal that in most of the study areas planning propensity and subjective efficacy had a higher predictive efficiency than openness to change. Further analysis reveals that, except in urban Meghalaya, subjective efficacy had greater direct effect on small-family attitude than various demographic and resource variables and even more than mass media exposure (see Mukherjee, 1978a:120). When the three modernity variables were excluded as independent variables from the equation for predicting small-family attitude, the multiple R^2 was reduced considerably in all study areas except the urban strata of Tamil Nadu and Meghalaya, the reduction ranging from .04 to .19. Thus the three modernity variables were generally quite ef-

TABLE 10 Beta weights in the prediction of attitudes toward small family size, using modernity values and other education-related variables as predictors

Predictor variable	Haryana Rural	Haryana Urban	Tamil Nadu Rural	Tamil Nadu Urban	Meghalaya Rural	Meghalaya Urban
Subjective efficacy	.23*	.24*	.26*	.19	.08†	−.04
Openness to change	.20*	.06	.23*	.06	−.01	−.11
Propensity to plan	−.04	.12	.26*	.41*	.45*	.33*
Education	.06	.03	−.07	−.36*	.03	.06
Mass media exposure	.08	.07	.16*	.36*	.04	−.05
Husband-wife communication	.14*	.14*	−.05	−.07	−.13*	.00
R^2	.20	.19	.36	.24	.24	.10

* Significant at the .01 level.

† Significant at the .05 level.

fective in fitting the small-family attitude data. Except in urban Tamil Nadu and urban Meghalaya, the predictive efficiency of subjective efficacy and openness to change appears to have been clearly beyond chance. In these two study areas, planning propensity alone emerged as a strong predictor of small-family attitude.

Prediction of pregnancy rates from modernity values

The present study examined the intrinsic relationship between fertility (the dependent variable), as measured by number of pregnancies per 100 months of exposure, and a set of modernity-related independent variables: subjective efficacy, openness to change, planning disposition, education, family planning decision-making power, and attitude toward small family size. For the multiple classification analysis, each independent variable was trichotomized. Measures for only three of the independent variables are shown in Table 11. Adjusted means represent the grand mean based on the total sample size in a given study area plus the net effects of all other remaining characteristics (independent variables) under analysis. With these adjusted means, it can be seen, for example, whether women with high subjective efficacy in a particular study area showed lower pregnancy rates than the grand average rate for the stratum and whether the difference continued even after the effects of other variables were controlled.

Table 11 also shows the net effects, or adjusted deviation from the grand mean, of each category of independent variable on the pregnancy rates. The values in the net effect columns show the effect of being in one or another category, taking into account the confounding effects of other correlated variables included in the analysis.

It can be seen from Table 11 that in one area, urban Tamil Nadu, subjective efficacy affected pregnancy rates. In urban Tamil Nadu, respondents with high subjective efficacy had a substantially lower pregnancy rate than did other women in this stratum. Before any statistical adjustment, the mean pregnancy rate for the group with high subjective efficacy was 2.11, or .47 below the grand mean for this stratum. After the combined effects of openness to change, planning propensity, education, family planning decision-making power, and attitude toward small family are taken into account, the adjusted mean for the high efficacy group still falls below the grand mean by .49. In the other study areas, however, none of the three modernity values showed such a clear-cut inverse relationship with the pregnancy rate.

The results of the MCA suggest in general that lack of modernity values does not, in itself, explain high fertility rates, for even after women have acquired modernity values, the process of fertility control can be clocked at different stages. A woman who wants to restrict her childbearing must have the knowledge of an effective contraceptive method and strong modernity values, but other motivational and situational conditions must also be conducive to the practice of family planning.

To determine the predictability of fertility, a multiple regression analysis of total reported pregnancies was also run for each study area. In addition to subjective efficacy, openness to change, and status at home, four aspects of family planning were treated as independent variables: family planning knowledge, small-family attitude, desire for no more children, and family planning adoption. The results are reported in Table 12. In each study area, the desire for no more children emerged as the best single predictor of fertility. But small-family attitude, perceived status at home, and family planning knowledge also proved to have predictive power in some study areas. Openness to change emerged as a significant predictor in rural Meghalaya. Unexpectedly, openness to change showed positive rather than negative values in Haryana and rural Tamil Nadu; and while family planning knowledge generally had positive weight, the weight for attitude toward small family size was negative. These results suggest that even though a woman gains increased knowledge of family planning with increasing parity, the normative pattern of large family size (unfavorable attitude toward small family size) continues.

TABLE 12 Beta weights in the prediction of reported number of pregnancies, using fertility-related and modernity variables as predictors

	Haryana		Tamil Nadu		Meghalaya	
Predictor variable	Rural	Urban	Rural	Urban	Rural	Urban
Openness to change	−.05	−.03	−.06	.15	.09†	.14
Subjective efficacy	−.01	−.10	−.02	−.13	.02	.12
Family planning knowledge	.07*	.05	.10*	−.06	.14*	−.14
Attitude toward small family	−.17*	−.10†	−.05	−.15†	−.25*	−.15
Status within home	.07†	.07	.09†	−.12	.01	−.01
Desire for no more children	.56*	.50*	.53*	.60*	.40*	.35*
Family planning adoption	−.01	.09	.02	.16	−.02	−.06
R^2	.35	.31	.31	.50	.21	.37

* Significant at .01 level.

† Significant at .05 level.

DISCUSSION

The study's findings were mixed. Correlational analysis revealed that knowledge of contraception and attitudes toward family planning were almost consistently related in a positive direction to all three of the modernity values, as expected. Although the modernity values appeared to be moderately related to attitude toward small family size as well as to family planning attitude, they showed a weak relationship with contraceptive adoption. Planning propensity was found to be significantly related to contraceptive adoption in three of six study areas. Similarly, subjective efficacy showed a significant relationship to contraceptive adoption in the urban strata of Haryana and Tamil Nadu. But most of these relationships were washed out when other fertility-related factors were statistically held constant. The study also failed to show a significant relationship between modernity values and pregnancy rates. Certain interesting differences between study areas emerged from the investigation. Each of the above-mentioned results is discussed in this section. I will also attempt to assess the implications of these findings for future research.

Family planning correlates of modernity values

The study addressed the general problem of whether modernity values are related to family planning knowledge, attitude, and behavior. The results show that subjective efficacy, openness to change, and planning were positively related to family planning knowledge and attitude. Except in urban Meghalaya the first two modernity variables were also related to attitude toward small family size. Planning propensity consistently showed a positive relationship to both of the attitudinal variables. Furthermore, in Haryana and Tamil Nadu, subjective efficacy and openness to change were positively related to respondents' beliefs about the ideal age for a daughter to marry. Traditional women believed that they had a negligible role in decision-making on family planning matters. Both in Haryana and in Tamil Nadu such women reported more restrictions imposed on their activities by their husbands than did women scoring high on the modernity indices.

No clear relationship between either subjective efficacy or openness to change and family planning adoption emerged in the correlational analysis except in the urban strata of Haryana and Tamil Nadu. And in these two states the relationships between the modernity variables and adoption were not so strong as they were between family planning attitudes and adoption. This finding is not surprising, for family planning adoption is more closely related to specific attitudes toward family planning and small family size than to broader predispositions like subjective efficacy, planning propensity, and openness to change. It is possible that for some women the adoption of contraception may itself lead to greater favorability toward family planning and small family size.

Canonical correlation analysis showed not only the overall relationship between modernity values and family planning variables, but also, in Haryana, the connection between planning propensity and contraceptive acceptance. It appears that in Haryana favorability toward small family size, as well as knowledge of and positive attitude toward family planning, tended to increase with higher receptivity to change and higher subjective efficacy. These findings are consistent with the interpretations given to the zero-order correlations (Table 3) and also with the results of the multiple regression analysis, but they are now applicable to the overall relationship between modernity values and family planning variables. The canonical analysis provides further support for the hypothesis that modernity values, together with family planning knowledge and attitude, favorability toward small family size, and contraceptive adoption, would emerge in a cluster of strongly associated characteristics. Such a cluster is seen clearly in the urban Tamil Nadu sample.

Results of the multiple regression analysis (Tables 7 and 9) provide some basis to test the assumption that the relationship between contraceptive adoption and modernity values remains statistically significant under extensively controlled conditions. The beta coefficients reported in Table 7 clearly show that in urban Tamil Nadu contraceptive adoption was related to the modernity variables, even when socioeconomic and demographic characteristics were held constant.

In urban Haryana also, subjective efficacy retained its efficiency as a predictor of contraceptive adoption even after the resource, communication, and status variables were controlled. However, when in addition to these three sets of control variables, knowledge and attitudinal variables connected with family planning were held constant, the relationship between subjective efficacy and contraceptive adoption in urban Haryana was washed out (Table 9). Moreover, except in rural Haryana, the relationship between propensity to plan and contraceptive adoption became nonsignificant when the above-mentioned sets of variables were held constant. It is noteworthy that the standardized partial regression coefficients (beta weights) of planning propensity became negative and statistically significant at the .01 level in Meghalaya after the statistical control. Thus the positive relationships between modernity values and contraceptive adoption did not generally hold up with statistical controls.

The intervening role of modernity values

"The common-sense expectation that . . . psychological variables are likely to function primarily as intervening variables" (Williamson, 1970:336) is not clearly supported by findings of the present study. Only in urban Haryana were subjective efficacy and openness to change found to have some intervening effects between background variables and contraceptive adoption. The study thus helps to clarify the linkages, via modernity values, between adoption and background characteristics.

It is frequently asserted that socioeconomic development is the best contraceptive and that, with improved socioeconomic conditions, there will be not only an increase in family planning adoption but also a decline in fertility rates. According to Rich (1973:2), a "large-scale fertility decline cannot be expected until the living conditions of the majority of the population improve enough so that they no longer consider a large family necessary." Even if the above thesis is accepted, there is a need to show empirically how improved social and economic conditions might have a negative effect on fertility. The present study shows that in urban Haryana, where modernity values were found to play a substantial intervening role, the number of modern household items possessed by the respondent (a crude index of living level) might have directly encouraged contraceptive acceptance; but its main effect on adoption seemed to operate through modernity values. Similarly, education was found to promote adoption and to discourage high fertility in urban Haryana mainly through its positive influence on subjective efficacy and also through its effect on number of additional children desired, rather than through increased knowledge of contraception. In urban Haryana, therefore, modernity values appeared to function as intervening variables between background characteristics and family planning adoption.

In addition to such intervening influences, subjective efficacy and openness to change seemed to influence to some extent what Davis and Blake (1956) have called "norms about intermediate variables" and "norms about family size." This is so because women with high modernity stated higher ideal ages at marriage for their daughters than other respondents. Similarly, those with high subjective efficacy indicated greater favorability toward small family size than others, which in turn might have negatively influenced the number of pregnancies they experienced. The two modernity variables also correlated significantly with family planning knowledge and attitude.

It must be emphasized, however, that in urban Tamil Nadu openness to change and subjective efficacy functioned more as independent determinants of family planning adoption. Results of the multiple regression analysis suggest that in that study area a family planning program may not be very effective in accelerating contraceptive adoption until women experience social modernization in the form of improved educational attainment and better status at home, and until they acquire certain modernity values. It appears that in urban Tamil Nadu the modernity values can exert their influence directly and independently on contraceptive adoption rather than merely operate as intervening variables.

Modernity values and attitude toward small family size

The correlational analysis showed that married women in Haryana with the following characteristics were more likely to be favorably disposed toward small families than other women: (1) the better educated and those whose husbands also were better educated; (2) those who had more modern household items in their homes; (3) those who reported greater frequency of communication with their husbands re-

TABLE 11 Multiple classification analysis of pregnancy rates per 100 months of exposure for married women, by level of subjective efficacy, openness to change, and propensity to plan

Category of independent variable	Haryana				Tamil Nadu				Meghalaya			
	N	Mean[a]	Adjusted mean[b]	Net effect	N	Mean[a]	Adjusted mean[b]	Net effect	N	Mean[a]	Adjusted mean[b]	Net effect
RURAL												
Subjective efficacy												
Low	276	3.08	3.10	−.03	100	2.27	2.21	−.27	85	3.66	3.74	.08
Medium	258	3.16	3.16	.03	159	2.59	2.58	.09	202	3.92	3.89	.07
High	91	3.18	3.13	.00	93	2.52	2.60	.11	146	3.78	3.76	−.06
Openness to change												
Low	33	3.12	3.16	.03	59	2.47	2.69	.20	111	3.62	3.69	−.13
Medium	455	3.12	3.12	−.01	234	2.55	2.50	.01	308	3.89	3.86	.04
High	37	3.17	3.13	.00	57	2.27	2.25	−.24	12	3.76	3.78	−.04
Propensity to plan												
Low	50	3.12	3.16	.03	41	2.30	2.33	−.16	66	3.72	3.81	−.01
Medium	294	3.12	3.12	−.01	200	2.49	2.47	−.02	179	3.64	3.70	−.12
High	281	3.16	3.13	.00	114	2.55	2.57	.08	188	4.03	3.93	.11
URBAN												
Subjective efficacy												
Low	50	2.85	2.95	−.16	12	2.85	2.84	.26	5	3.51	3.48	−.55
Medium	93	3.20	3.20	.09	41	2.70	2.71	.13	41	4.47	4.36	.33
High	80	3.18	3.13	.02	19	2.11	2.09	−.49	52	3.75	3.85	−.18
Openness to change												
Low	4	2.73	2.81	−.30	9	2.44	2.28	−.30	19	4.20	4.20	.17
Medium	133	3.09	3.16	.05	52	2.60	2.61	.03	77	3.98	3.99	.02
High	86	3.17	3.05	−.06	12	2.58	2.65	.07	3	4.56	4.11	.08
Propensity to plan												
Low	9	2.43	2.53	−.58	3	3.32	2.18	−.40	8	4.92	4.72	.69
Medium	94	2.91	2.89	−.22	45	2.65	2.61	.03	35	3.77	3.90	−.13
High	120	3.32	3.33	.22	25	2.36	2.57	−.01	56	4.08	4.02	−.01

[a] Class mean before adjustment.

[b] Adjusted mean, with effect of four other independent variables controlled.

garding family planning; (4) those who had had greater exposure to mass media; (5) those who expressed a greater sense of personal efficacy, openness to change, and planning propensity; and (6) those who lived in urban areas. When a multiple regression analysis was run, however, it became evident that education and mass media exposure were of no use in predicting attitude toward small family size among married women in Haryana. Subjective efficacy and interspouse communication retained their predictive efficiency even after other education-related variables were statistically held constant. It is doubtful, therefore, that favorability toward small family size and subjective efficacy among the Haryana sample were in any way part of a value complex determined chiefly by formal schooling.

Among the three value orientations, subjective efficacy turned out to be in Haryana the best determinant of small-family attitude. In urban Haryana the effects of the other two modernity values were completely washed out. Only in rural Tamil Nadu did all three of the modernity values emerge as significant predictors of small-family attitude. In Tamil Nadu, planning propensity and mass media exposure showed an impressive capacity to survive the partialling process and to defend their standing as independent determinants of small-family attitude. In Meghalaya also, planning propensity emerged as a more powerful determinant of small-family attitude than either of the other modernity values when the education and communication variables were held constant. The findings indicate, therefore, that even after education, mass media exposure, and interspouse communication are controlled, the value orientations of planning propensity, subjective efficacy, and to some extent even openness to change are likely to exert some effect on attitudes toward small family size. Although subjective efficacy contributed substantially to the variation in attitudes toward small family size in Haryana, planning propensity turned out to be a stronger predictor of small-family attitudes in both Tamil Nadu and Meghalaya. Openness to change appeared to function generally as an intervening variable between socioeconomic characteristics and small-family attitudes rather than as an independent determinant.

Aspects of family planning independent of modernity

The study has shown that modernity values are not necessary conditions for either the acquisition or the use of contraceptive knowledge for family limitation. Nevertheless, there is some evidence that in the absence of modernity values, family planning decision-making power or favorability toward small family size may not necessarily lead to contraception. Like the availability of contraceptives, modernity values are likely to serve as catalysts of contraceptive use. Women with higher subjective efficacy, openness to change, and planning tendency may be more likely than others to translate their favorability toward small family size into action in particular settings. It appears that small-family norm is related to contraceptive use through differential modernity values. It seems plausible that many women who have already adopted the small-family norm do not practice contraception because of their weak sense of efficacy. Fatalistic attitudes, for example, may prevent some women from translating their ideals about small family size into action. Thus subjective efficacy may play the role of a moderating variable.

Poor prediction of fertility from modernity variables

Despite the impressive volume of research on differential fertility, Fawcett's (1970) review suggests that we still know very little about psychological causes of high fertility, although much is known about the correlations between fertility rates and such social indicators as education, religion, occupational status, and rural-urban residence. The Indianapolis study (Kiser and Whelpton, 1953) and subsequent Princeton studies (Westoff and others, 1961; Westoff, Potter, and Sagi, 1963) showed that psychological variables had little power in explaining differential fertility. More recently Gough acknowledged that "the prediction of family size, i.e. fertility, from psychological measures on individuals is clearly an unsolved problem at the present time" (1973: 330).

The present investigation also failed to demonstrate conclusively the direct effects of psychological variables on individual-level fertility. Although multiple classification analysis showed some trend of monotonic decrease in the level of individual fertility with an increasing level of subjective efficacy, the results were not statistically significant even at the .05 level. Moreover, the trend was observed only in urban Tamil Nadu, and even there the results did not support the hypothesis that women with strong modernity values will have lower fertility than other women.

Multiple regression analysis of the number of pregnancies among urban Tamil Nadu revealed that subjective efficacy and openness to change, in combination with age, education, status within the home, desire for no more children, family planning knowledge and attitude, and adoption of family planning, accounted for about 55 percent of the variance. The regression coefficient for education alone in this analysis turned out not to be significant even at the .05 level. Age and education accounted for only 13 percent of the variance in pregnancy data. When combined with the two modernity predictors, the proportion of variance in pregnancy rose to 15 percent. Thus only 2 percent of the variance increase was due to the independent contribution of the two modernity variables.

Although the direct contribution of the modernity variables in predicting fertility was very small compared with that of the desire variable (wanting no more children) and adoption, the usefulness of broad attitudinal and value-related predisposition measures should not be solely gauged by their ability to predict variance in a criterion measure, the reliability of which may itself be suspect. It is not reasonable to expect psychological or personality measures to have much efficiency in predicting reproductive behavior if half the variance in fertility is due to situational and involuntary factors (Sagi and Westoff, 1963). "It is only within given situations that specific predictions from personality measures are likely to become meaningful, yet the interaction between personality and situation has yet to be a major concern for fertility researchers" (Russo, 1972:65).

Variables like subjective efficacy and openness to change as conceptualized in this study relate to subjects' perceptions of how to interact with and control different aspects of the environment. As these predispositions may not directly affect fertility—especially where situational and accidental factors are salient—they are still likely to enhance the ability of women to make decisions about such matters as family size and spacing. The findings show such an indirect effect of the modernity variables.

The findings for urban Tamil Nadu and to some extent for urban Haryana provide considerable substantiation of the predictability of family planning adoption and fertility from modernity values, but that is not the case for the other study areas, especially Meghalaya. Either modernity values are of little importance to the determination to accept contraception or they lead to the adoption of family planning only when other important conditions are also favorable. Since modernity values were found to be quite efficient as independent predictors of family planning adoption in the urban strata of Tamil Nadu and Haryana but not in the other four study areas, it seems reasonable to ascribe the negative findings to prevailing normative patterns and differential levels of socioeconomic development in the six study areas during late 1972. It appears that in the other study areas women with strong modernity values did not report a higher level of contraceptive adoption not so much because someone actively thwarted their efforts but rather because of the unresponsiveness of the system and the people around them, who served to encourage high fertility.

Differences between study areas

Of all six study areas, rural Meghalaya was the most backward in levels of living, mass media exposure, and urbanization, conditions that favor high fertility. Respondents in Meghalaya generally had lower economic status than respondents in Haryana or rural Tamil Nadu, and this appears to be in some way related to the former group's strong fatalism and sense of low status within the home and the community. Such attitudes were particularly characteristic of Khasi women from the rural areas. Khasi women's attitudes and values were also found to be more traditional than one might have imagined, judging from their exposure to Western influences. Khasi women from the Bhoi block of Meghalaya scored significantly lower on openness to change, for example, than their counterparts in Haryana and Tamil Nadu. There was also less variability in scores on openness to change and household items owned in Meghalaya than in the other states. In view of such narrow ranges in the independent variables, not much variation in family planning adoption and fertility can be explained in Meghalaya.

As reported earlier, in social development urban Tamil Nadu appeared to be the most modernized study area, owing to its being the most urbanized. Since urbanization and the spread of urban attitudes are strongly correlated with family planning adoption, it is not surprising that urban Tamil Nadu was further along in its demographic transition than the other areas. (See also Mukherjee, 1974a.) This study area seems to have had a predominance of those value orientations and necessary socioeconomic development that are conducive to family planning adoption.

The survey data reveal that compared with urban Haryana, urban Tamil Nadu had a greater percentage of economically active women, a higher level of education on the part of the husband, the lowest percentage of fatalism among respondents, and also greater favorability toward small family size. In a state-level survey of Haryana and Tamil Nadu conducted in late 1971 (Mukherjee, 1974a), it was found that Tamil Nadu had a greater percentage of family planning acceptors who were interested in continuing to use contraceptives, a greater proportion of nonadopters who said that they did not want additional children, and a larger incidence of favorable attitudes toward family planning.

The present survey found the general level of female education to be lower in rural Haryana than in rural Tamil Nadu. The number of restrictions imposed on women's activities was also significantly higher in rural Haryana than in rural Tamil Nadu. In subjective efficacy, small-family attitude, mass media exposure, and knowledge of contraceptive methods, rural Tamil Nadu respondents scored higher than their rural Haryana counterparts. About 11 percent in rural Tamil Nadu expressed a desire for more children, compared with 19 percent in rural Haryana. Other data suggest that despite better economic conditions, the level of social development was lower in rural Haryana than in rural Tamil Nadu.

For these reasons, it appears that there has been relatively little diffusion of modernity values among women of rural Haryana and that consequently modernity values do not function there as independent determinants of either family planning adoption or fertility. The fertility differential due to female education, economic status, and labor force participation is inextricably mixed with cultural factors encouraging a large-family norm. To some extent, this explanation also holds true for rural Tamil Nadu. The tradition of bearing five or six children is still deep-rooted in rural Tamil Nadu and is almost independent of religion, education, occupation, or modernity values.

In contrast, the Tamil Nadu urban stratum seemed to be moving toward an advanced stage of demographic transition, in which the cumulative effects of social development and an aggressive family planning program are likely to lead to significant reductions in family-size norm (Mukherjee, 1975f). It seems quite likely that under these conditions modernity values will encourage women to adopt contraception for limiting family size.

It should be noted, however, that in urban Tamil Nadu only about 23 percent of the variance in family planning adoption could be accounted for solely by the three modernity values. All of the demographic, resource, and communication variables, considered together, explained only 30 percent of the variance. In the other study areas the amount of explained variance in adoption due to modernity values was still lower. This low predictability may be due to underestimation resulting from three biases: (1) the criterion variable (adoption) was divided into only three categories of adopters; (2) the multiple regression analysis did not take into account the possibility that an interaction might exist between the three modernity values, the resource variables, and other independent variables in their relation to adoption; and (3) the analysis failed to allow for the possibility that some of the independent variables, such as modern household items, might have a curvilinear relationship with adoption.

The completely unexpected tendency on the part of nontraditional women, especially in rural Meghalaya, to experience a greater number of pregnancies and to be less receptive to contraception than more traditional women may have several explanations. It seems plausible that the cultural norm favoring large families is so strong in rural Meghalaya that it produces exaggerated traditional behavior, reflected in the nonacceptance of contraception and a high fertility rate.[2] The normative pattern with regard to such things as family size, marriage (strictly exogamous), and divorce may have overcome even those married Khasi women of high education and modernity values, who in time may have abandoned their hope of influencing a nonresponsive system that led them to feel the futility of trying to control family size. Women showing such behavior are thus in some way modern in their outlook but still traditional in their actual behavior because of the social system in which they live. As long as the level of socioeconomic development remains low and social pressures favor large families, the mere acquisition of modernity values will not necessarily bring about a decline in fertility. The data suggest that a favorable attitude toward small family size was most pronounced among women who believed they had the capacity to overcome problems by hard work rather than through sheer luck.

The results indicate that a small-family norm is taking root even in rural areas but is not spreading to all classes. In Haryana and Tamil Nadu, it was confined to respondents having some exposure to mass media or strong modernity values. It should be noted, however, that in Meghalaya a large proportion of respondents who had low scores on openness to change expressed favorable attitudes toward small families; the converse of this trend was also noted in quite a few cases. It appears that most Khasi women had an ambivalent attitude toward small families. Whether their ambivalence was the result of broad knowledge of the pros and cons of large and small families or whether it was a function of disappointments from having large families is difficult to say. There was also a large number of respondents who demonstrated congruence between their attitudes toward small family size and openness to change; it appears that those respondents in Meghalaya would be most receptive to family planning adoption.

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[2] As additional evidence, the decennial growth rate in Meghalaya (1961–71) was 31.5 per thousand, compared with an Indian average of 22.7.

Implications for future research

Although the study failed to demonstrate conclusively the direct effects of openness to change and subjective efficacy on pregnancy, these modernity variables did predict contraceptive use, knowledge of family planning methods, attitude toward small family size, and attitude toward family planning. For this reason, it seems worthwhile to include them as variables in future fertility research. It is possible that with further refinement in the measurement of these two modernity variables, their predictive efficiency in fertility studies will be enhanced. It also seems plausible that other, unobtrusive measures of modernity behavior will show better success in predicting individual fertility.

The findings demonstrate the need for including in fertility surveys questions about attitudes toward family size and family planning. Often the attitudinal and intentional aspects of contraception are neglected in such surveys, and the number of living children or some other index of individual fertility becomes the main dependent variable. Yaukey (1969) has asserted that such a narrow focus not only restricts the scope of fertility research but also fails to show the linkage between demographic factors and fertility. He has argued for more research on the various links in the causal chain connecting social environment, the intermediate variables identified by Davis and Blake (1956), and fertility itself. The present study suggests that one way in which the education of women affects family planning adoption and therefore fertility is that it provides a sense of personal efficiency, which brings about positive change in women's perceptions of their status at home and also in their decision-making power. The results lend support to the hypothesis that education acts as a stimulant to social aspirations, thus motivating women to limit their family size and increasing their ability to use contraceptives effectively (Carleton, 1965).

The study's negative findings suggest two research strategies. One is to measure the intensity with which different modernity values are held, in order to detect the difference between those persons who merely say they attach importance to a given value and those willing to behave in consonance with it. Another is to measure other conditions that may determine whether a modernity value will be expressed in actual behavior and to analyze the relationship between values and behavior in the light of such conditions.

In addition to demonstrating the need for such contextual analysis, the study shows that there is substantial unexplained variance in fertility and suggests that either the measure of fertility used was largely unpredictable and highly fortuitous, or additional predictors, especially those incorporating such economic variables as consumption pattern, savings, the economic utility of children, aspirations for children's education, and the perceived cost of raising children, need to be included in the prediction system.

The findings also suggest that much more careful attention needs to be given to identifying and measuring value orientations that are logically and empirically related to high fertility. In addition, methodological questions such as the following should be (but often are not) considered in studies dealing with prediction of contraceptive adoption and fertility: 1. Does the study aim at determining concomitant and antecedent-consequent relationships? 2. Is the criterion of family planning behavior based on a single variable defined with limited information (e.g., answers to a single question on adoption status or contraceptive knowledge), or on scores based on different KAP aspects of contraceptive adoption? 3. Is prediction of adoption status attempted from a single-item predictor (e.g., answers to a single question, test, or inventory item dealing with subjective efficacy), or from scores based on differentially weighted variables forming sets of homogenous scales? 4. Are the regression coefficients for prediction based on experience with a single sample or replicated and cross-validated with different types of samples? 5. Is prediction of adoption or fertility attempted on an actuarial or group basis, or is it concerned with prediction for a particular type of woman? 6. What is the extent to which the proposed prediction equation of the study design takes into consideration the situational factors? Is prediction of future contraceptive adoption made on a contingency basis, in which the conditions favoring adoption can be specified in advance? 7. Does the study aim at short-term or long-term prediction of family size? If long-term, is it based on longitudinal data? 8. Since most questionnaire-type psychological measures have not so far demonstrated sufficient forecasting efficiency or power to be used in routine or perfunctory functions for predicting fertility, should thought be given to the use of observation techniques such as a check list or anecdotal records as an alternative or supplement to the use of questionnaire items, which place a heavy burden of comprehension, trustworthiness, and seriousness of purpose on the respondent? These questions are representative of the considerations that should be given to the overall design of studies on this topic.

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PREFACE

This paper is one of several issuing from a joint project of the National Statistical Office of Thailand and the East-West Population Institute to estimate refined measures of fertility and mortality from the 1970 Census of Thailand. Support for the research was jointly provided by the National Statistical Office, the East-West Population Institute, and the United States Department of Commerce. The authors are grateful to Ms. Victoria Ho, Mr. Pichai Saiyasombati, and Ms. Robin Loomis for programming and research assistance.

ABSTRACT Own-children estimates of fertility levels, trends, and differentials for Thailand over the decade of the 1960s, based on the 1970 Census, appear broadly consistent with other published estimates. Total fertility for the whole country declined slightly from about 6.5 to 6.2 children per woman between 1960–64 and 1965–69. All four regions–North, Northeast, Central, and South–showed total fertility rates between six and seven children per woman for 1960–64. By 1965–69 total fertility had fallen by somewhat over half a child in the North and Central regions, remained almost unchanged in the South, and increased slightly in the Northeast.

For the country as a whole, rural total fertility declined slightly from about 6.7 in 1960–64 to about 6.5 in 1965–69. Urban total fertility, which was about 1.5 children lower than rural total fertility to begin with in 1960–64, fell substantially from approximately five to four children by 1965–69. Rural women with more than a primary education showed a substantial fertility decline, but they were too small a proportion of all rural women to have much impact on overall rural fertility. Among urban women, fertility declined considerably in all educational strata. Age at marriage changed little over the 1960s, so that trends in marital fertility closely paralleled trends in overall fertility.

In recent years there has been in Thailand, as in many other developing countries around the world, a rapidly growing awareness of the importance of demographic factors in economic and social development. The need for accurate demographic information about the population has been accentuated by the government's growing involvement in economic and social planning. Such planning requires as essential ingredients accurate estimates and projections of population size, distribution, and composition; projections in turn require accurate information about present levels and recent trends of birth, death, and migration rates.

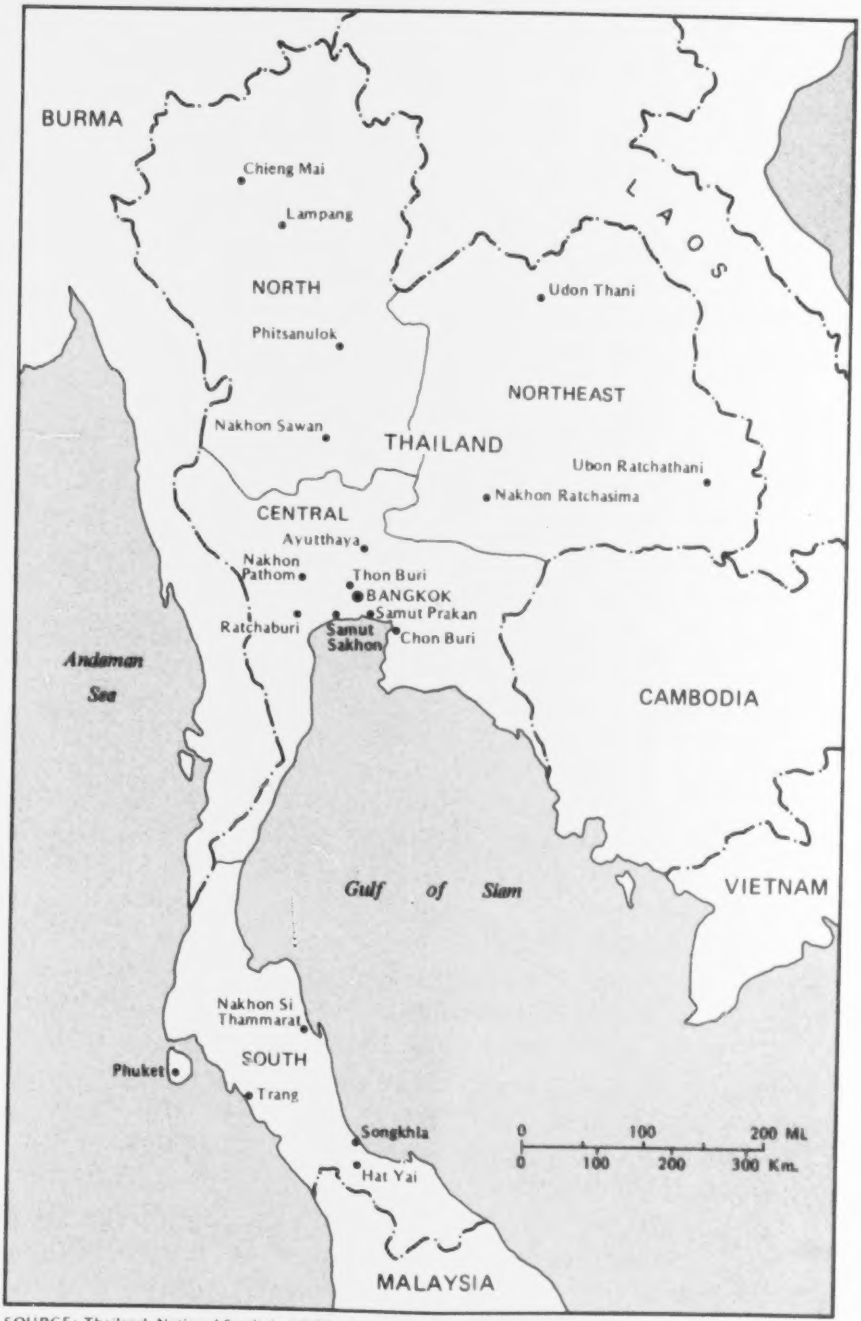
Accurate estimates of levels and trends of birth rates are also needed to evaluate the government's family planning program. Thai government involvement in family planning began informally in 1968 under the direction of the Ministry of Health. In 1970 the government promulgated an official national population policy supporting national family planning. In 1972 the Third Five-Year Economic and Social

Development Plan called for reduction of the rate of population growth from over 3 percent to about 2.5 percent by 1976, a goal that appears to have been approximately achieved. The Fourth Five-Year Plan calls for a continued reduction in fertility to achieve a growth rate of 2.1 percent by 1981. The rapid growth of a large-scale family planning program in response to these new population policies has intensified the need for local as well as national fertility estimates in order to monitor the program and ensure efficient operation and optimal allocation of family planning funds among the different geographic areas of the country.

The government has responded to the pressing need for accurate fertility statistics by supporting a variety of data collection efforts. Compulsory birth and death registration has been in effect in Thailand since 1917 but is still characterized by considerable underregistration. Therefore, principal reliance has been placed on fertility estimates derived from census and survey data, including a 1 percent sample from the 1960 Census (S. Goldstein, A. Goldstein, and Piampiti, 1973; Goldstein, 1970, 1972, 1973), the 1964–67 and 1974–76 Surveys of Population Change (Thailand, National Statistical Office, 1969, 1976, 1978), the 1969–73 Longitudinal Study of Social, Economic, and Demographic Change (Knodel and Pitaktepsombati, 1973, 1975; Knodel and Prachuabmoh, 1973; Institute of Population Studies, 1971), and the 1975 Survey of Fertility in Thailand, which is part of the World Fertility Survey (Institute of Population Studies and National Statistical Office, 1977; Arnold and Pejaranonda, 1977; Knodel and Debavalya, 1978). A number of indirect estimates have also been made, but these are summarized elsewhere and are not recapitulated here (Arnold, Retherford, and Wanglee, 1977).

This paper presents fertility estimates for Thailand based on application of the own-children method of fertility estimation to an approximately 2 percent sample of households from the 1970 Census. Following a discussion of data and methodology, the first part of the paper presents own-children estimates of total fertility rates and age-specific birth rates for Thailand and the four regions of North, Northeast, Central, and South (Figure 1) by rural-urban residence for the periods 1961–65 and 1966–70. Estimates of standardized marital general fertility rates and age-specific marital birth rates are presented for the same geographic subdivisions and time periods. A decomposition technique is then applied to analyze how much of the change in the total fertility rate between 1961–65 and 1966–70 is due to changes in age-specific proportions married and how much is due to

FIGURE 1 The four regions and the 20 largest municipal areas: Thailand, 1970


BURMA
Chieng Mai
Lampang
NORTH
Phitsanulok
Nakhon Sawan
THAILAND
L A O S
Udon Thani
NORTHEAST
Ubon Ratchathani
Nakhon Ratchasima
CENTRAL
Ayutthaya
Nakhon Pathom
Thon Buri
BANGKOK
Samut Prakan
Ratchaburi
Samut Sakhon
Chon Buri
Andaman Sea
CAMBODIA
Gulf of Siam
VIETNAM
Nakhon Si Thammarat
SOUTH
Phuket
Trang
Songkhla
Hat Yai
0 100 200 ML
0 100 200 300 Km.
MALAYSIA

SOURCE: Thailand, National Statistical Office (1973, table 18).

changes in age-specific fertility. Finally, estimates of total fertility rates and age-specific birth rates by women's education, occupation, and religion are presented for the periods 1961–65 and 1966–70 for the country as a whole and by rural-urban residence.

DATA AND METHODOLOGY

In this paper the own-children method of fertility estimation is applied to an approximately 2 percent census sample of Thailand's 34.4 million population on 1 April 1970. The sample is of enumeration districts, with a sampling ratio of 10 percent for municipal areas and 1 percent for nonmunicipal areas. The weighted sample is representative by rural-urban residence at the level of the four regions–North, Northeast, Central, and South–but not at the level of the 71 provinces. Therefore, province-level fertility estimates based on this sample are not possible. A more detailed description of the sample has been given by Arnold and Boonpratuang (1975).

The own-children method of fertility estimation has been described in detail elsewhere (see, for example, Cho, Grabill, and Bogue, 1970; Cho, 1971, 1973; Retherford and Cho, 1978; Retherford, 1978; Retherford, Choe, and Wanglee, 1978) and need only be recapitulated briefly here. In essence, the method is a census- or survey-based reverse-survival technique for estimating age-specific fertility for years previous to a census or household survey. Enumerated children are first matched to mothers within households, usually on the basis of answers to questions on age, sex, marital status, relation to head of household, and number of children still living (Ho, 1977). Matching may be accomplished more simply if line number of mother, if present, is coded for each child in the household (this was not done in Thailand). These matched (i.e., own) children, classified by own age and mother's age, are reverse-survived to estimate numbers of births by age of mother in previous years. Reverse-survival is also used to estimate number of women by age in previous years. After adjustments are made for incorrect enumeration and unmatched (non-own) children, age-specific birth rates are calculated by dividing the number of births by the number of women. Typically the technique is applied to census data, and estimates are calculated for each of the previous ten to fifteen years. In the present application to Thailand, estimates are computed for each of the previous ten years.

The own-children method has the great advantage of not requiring pregnancy histories or other special questions on past fertility behavior. Its application to census data already collected for other purposes makes large samples economical; large samples in turn allow a level of detail in cross-tabulations of birth rates by geographic subdivision and socioeconomic characteristics that is not feasible in fertility surveys based on substantially fewer respondents. Age-specific rates may be tabulated by whatever characteristics are asked for on the census questionnaire. It must be noted, however, that age-specific rates for previous years can normally be tabulated only according to characteristics at the time of enumeration, not at the time the births occurred.

Reverse-survival requires annual life tables for the ten-year period previous to the census, specified by the same geographic subdivisions and socioeconomic characteristics for which fertility estimates are desired. At first sight, Feeney's (1976, 1977, 1979) method of estimating mortality trends from child survivorship data seems ideally suited to the task of estimating the necessary life tables. Feeney's method is an extension of Brass's (1975:50 ff.) method of estimating mortality from child survivorship data. Brass's method estimates the level of mortality for an indeterminate period in the recent past; Feeney's method, based on the same census data on age-specific numbers of children ever born and children still living per woman, estimates the trend as well as the level of mortality, with time reference points precisely specified.

But Feeney's and Brass's methods are not without problems. One difficulty is that they often substantially underestimate mortality owing to the omission of dead children in reported numbers of children ever born. Differential rates of omission can result also in serious distortion and even reversal of mortality differentials among geographic subdivisions and socioeconomic characteristics. Furthermore, the mortality estimates are sensitive to the choice of underlying model life table family that is presumed to fit approximately the previous mortality experience of the population under consideration.

Unfortunately, estimates of mortality for Thailand derived by applying Feeney's method to the 1970 Census appear too high, in both level and rate of decline (Retherford, Chamratrithirong, and Wanglee, 1980). Therefore, own-children fertility estimates in this paper are based instead on a single set of changing life tables by sex for the whole country. These life tables are computed under the assumption that national life tables by sex from the 1964–65 Survey of Population Change are correct for that date (Thailand, National Statistical Office, 1969; see also Appendix Tables A1 and A2), and that age-sex-specific probabilities of dying changed between 1960 and 1970 at the pace indicated by Rungpitarangsi's (1974:61–64) national life tables by sex for 1960 and 1970.

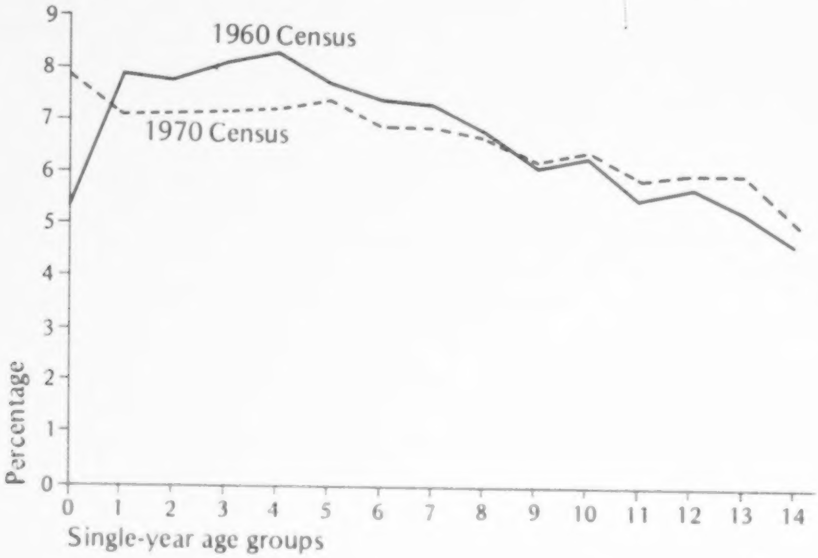
Mortality trends so estimated sacrifice specificity by geographic subdivision and socioeconomic characteristics, but they seem reasonably accurate as far as they go; moreover, the error in own-children fertility estimates for geographic subdivisions and socioeconomic characteristics that is introduced by the use of reverse-survival factors lacking such specificity is generally small. Because reverse-survival factors are not specified as finely as they should be, fertility differentials among regions and socioeconomic characteristics are somewhat understated. (For a more detailed discussion of the impact of alternative mortality assumptions on own-children fertility estimates for Thailand, see Retherford, Chamratrithirong, and Wanglee, 1980.)

To yield accurate estimates of age-specific fertility for single calendar years, the own-children method requires accurate age reporting. As shown in Figure 2, the quality of age reporting in Thailand's 1970 Census appears quite good. The deficit of children under one year of age, which is very noticeable in the 1960 Census, is not readily apparent in the 1970 Census. A deficit in the census count of this age group is quite common, particularly in developing countries. It may have been largely avoided in the 1970 Census because of an instruction to enumerators to probe on the presence of infants in the household.

The high quality of age reporting in Thailand's 1970 Census is also indicated by Myers's index of digit preference (Myers, 1940), which in 1970 was 1.4 for females and 1.7 for males. These values can be compared with the value of the index in the United States, which for both sexes combined was 2.2 in the 1950 Census and 0.8 in the 1960 Census. As noted elsewhere (Arnold, Retherford, and Wanglee, 1977: 8), Thailand's age distribution is unusually good in comparison with that of other Asian countries. Ueda (1976) reported that Thailand has the lowest score (highest accuracy) on the U.N. sex-age accuracy index among 28 countries in Asia and the Pacific. In the same study, Thailand was also shown to have relatively little digit preference according to both Myers's index and Whipple's index.

Although the quality of age reporting is good in Thailand, it is not perfect; moreover, there is some evidence of undercount. Were the percentage underenumerated or misreported the same at all ages, own-children fertility estimates would be unaffected; the numerator and denominator of a given rate would be diminished by the same factor, which would cancel itself. But in fact both underenumeration and misreporting are age-selective. Therefore, it is appropriate to ask what effect errors in the reported age distribution have on own-children

FIGURE 2 Single-year age distribution as percentage of total population aged 0–14: Thailand, 1960 and 1970



fertility estimates. To answer this question, we examine the effect of applying alternative sets of adjustment factors to correct the reported age distribution.

Two sets of adjustment factors by sex are available, an official set prepared by Arnold and Phananiramai (1975), which relies heavily on fertility and mortality estimates derived from the 1964–65 Survey of Population Change, and another set prepared by Fulton (1975), which involves the use of model life tables. The two sets of adjustment factors are shown in Table A3 in the Appendix.

Table 1 shows the effect of these adjustments on the own-children fertility estimates. The Arnold and Phananiramai adjustments have little impact on fertility estimates for 1960–64, compared with estimates based on no adjustments, but they reduce the pace of subsequent fertility decline. The Fulton adjustments eliminate the fertility decline entirely. We have opted for the official adjustments for two reasons, first because we accept mortality and fertility estimates based on the 1964–65 Survey of Population Change as the best estimates from which to compute adjustments, and second, because own-children fertility estimates based on the Arnold and Phananiramai adjustments are consistent with independent evidence that fertility in Thailand had already begun to decline by the late 1960s (Pardthaisong, 1978). (For a more complete discussion of adjustment factors, see Retherford, Choe, and Wanglee, 1978.)

It is worth noting that errors in the age distribution of women introduce less error in own-children fertility estimates than do errors in the age distribution of children. For example, if, owing to age heaping, the census or survey shows unusually large numbers of women aged 30, which is to some extent true of the Thai data, it also shows unusually large numbers of own children to mothers aged 30. Because women aged 29 and 31 have about the same child-woman ratios as women aged 30, heaping on age 30 has little impact on the child-woman ratio for women aged 30. In general, the age patterns of child-woman ratios and derived own-children birth rate estimates for a given year are affected little by age misreporting of women, even when the misreporting is severe.

Age heaping of children has more serious consequences, because it produces overestimates of fertility in some calendar years and underestimates in others. Heaping on age five, for example, inflates birth rate estimates for the sixth year previous to the census. This problem can be circumvented for the most part by aggregating reverse-survived births and women over groups of calendar years before dividing to obtain estimates of age-specific rates.

In applications of the own-children method in developing countries, fertility estimates for the first two years previous to enumeration, based on enumerated children aged 0 and 1, are generally discarded, because they usually reflect underenumeration and age overstatement of children under age 2, which produces an apparent but spuriously large fertility decline during those two years. Instead, aggregated estimates are computed for the two preceding five-year periods, based on children aged 2–6 and 7–11. These age groups have the additional advantage of largely encompassing and thus eliminating the effects of heaping on ages 5 and 10. In the present application to Thailand, however, estimates for the first two years previous to enumeration are retained, because coverage of children under age 2 is reasonably good, age reporting is reasonably accurate, and a set of age adjustment factors is available.

Table 2 shows total fertility rates and age-specific birth rates for Thailand based on two alternative aggregations of calendar years, the first consisting of three periods, 1960–63, 1964–66, and 1967–69, and the second consisting of two periods, 1960–64 and 1965–69. Results based on three periods show little fertility change between the

TABLE 1 Own-children estimates of total fertility rates and age-specific birth rates with and without adjustments for underenumeration and age misreporting: Thailand
(Rates per thousand)

Adjustment and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Arnold and Phananiramai adjustments (A&P)								
1960–64	6,483	86	274	313	281	215	106	20
1965–69	6,191	89	267	299	260	206	100	19
Fulton adjustments (F)								
1960–64	6,034	81	257	291	262	199	98	19
1965–69	6,008	84	256	289	256	202	97	18
No adjustments (N)								
1960–64	6,475	88	275	312	280	215	105	20
1965–69	5,763	80	246	277	245	193	94	17
A&P/N								
1960–64	1.00	0.98	1.00	1.00	1.00	1.00	1.01	1.00
1965–69	1.07	1.11	1.09	1.08	1.06	1.07	1.06	1.12
F/N								
1960–64	0.93	0.92	0.93	0.93	0.94	0.93	0.93	0.95
1965–69	1.04	1.05	1.04	1.04	1.04	1.05	1.03	1.06

NOTE: In own-children fertility estimation, calendar years are measured backwards from the census date, which in the present application is 1 April 1970. Therefore, own-children estimates for a given year, say 1969, refer to the period 1 April 1969 to 1 April 1970. Throughout this paper 1960–64 refers to the period 1 April 1960 to 1 April 1965, and 1965–69 refers to the period 1 April 1965 to 1 April 1970. Fertility estimates in the remainder of this paper are based on the Arnold and Phananiramai adjustments.

TABLE 2 Own-children estimates of total fertility rates and age-specific birth rates, based on alternative aggregations of calendar years: Thailand
(Rates per thousand)

Aggregation	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
4–3–3 grouping								
1960–63	6,486	86	273	314	280	217	107	20
1964–66	6,514	95	278	310	281	213	105	20
1967–69	5,977	83	261	291	247	200	96	18
5–5 grouping								
1960–64	6,483	86	274	313	281	215	106	20
1965–69	6,191	89	267	299	260	206	100	19

first and second periods followed by a substantial fall of fertility between the second and third periods. Results based on two five-year periods show a moderate fall. The decline of over half a child in the total fertility rate over the short span of only three years between 1964–66 and 1967–69 in the first set of estimates is implausible. In the remainder of this report, therefore, we present estimates only for the two five-year time periods, 1960–64 and 1965–69.

We compute age-specific marital birth rates under the assumption that all births occur within marriage, by dividing own-children estimates of age-specific birth rates by corresponding age-specific proportions currently married. These are obtained for each region by linearly interpolating age-specific proportions married from the 1960 and 1970 Censuses. Specification by rural-urban residence is not possible, because the rural-urban distinction was not included in the 1960 Census.

Age-specific proportions married for 1970 are taken with no adjustments from the 1970 Census, but those for 1960 are adjusted. In the 1970 Census, age was computed as the difference between the census date and the birth date in completed years. The 1960 Census, on the other hand, simply contained a question on current age, which resulted in a good deal of age misstatement. Chamratrithirong (1976) suggests that persons enumerated in the 1960 Census generally rounded their ages, so that age group 22, for example, ranged approximately from 21.5 to 22.5 instead of the usual 22.0 to 23.0. Therefore, we have shifted the proportions married by 0.5 year of age.

The adjustment is computed as follows: First age-specific proportions currently married are computed for 1960 in the usual five-year age groups. The adjusted proportion for ages a to a+5 is then obtained as

$$P_a^* = P_a + 0.1(P_{a+5} - P_a), \tag{1}$$

where lack of an asterisk indicates unadjusted proportions.

The age-specific proportions married include women of unknown marital status in the denominator. It is not clear that excluding such women improves the estimates, as it seems likely that a disproportionate number of unknowns are single, divorced, or widowed, in which case it is proper to include them in the denominator. In any event, the number of unknowns is very small.

The 1960 and 1970 Censuses were taken on April 25 and April 1, respectively. These dates are converted to decimal form as 1960.31 and 1970.25. Because calendar years for own-children fertility estimates are measured backward from the 1970 census date, a year such as 1969 runs from 1 April 1969 to 1 April 1970. Hence the midpoints of the periods 1960–64 and 1965–69, for which own-children estimates of age-specific birth rates are computed, are 1962.75 and 1967.75. Interpolated values of proportions married are obtained for these midpoints.

To avoid an unduly cumbersome analysis, summary measures of marital fertility and nuptiality are computed, in addition to age-specific marital birth rates and age-specific proportions married. The standardized marital general fertility rate (SMGFR) is the summary measure of marital fertility, and the singulate mean age at first marriage (SMAM) is the summary measure of nuptiality.

The standardized marital general fertility rate is calculated as

$$\text{SMGFR} = \frac{\Sigma\, P_a^m\, F_a^m}{\Sigma\, P_a^m} \quad , \tag{2}$$

where the summation ranges over ages 15–49 in five-year age groups, F_a^m denotes estimated age-specific marital fertility, and P_a^m denotes currently married women by age in the standard population, taken here as married women by age for all of Thailand (Thailand, National Statistical Office, 1973:17).

The singulate mean age at marriage is calculated as

$$\text{SMAM} = \frac{5\,\Sigma\, S_a + 15 - 25(S_{45} + S_{50})}{1 - .5(S_{45} + S_{50})} \quad , \tag{3}$$

where S_a denotes the proportion single for women aged a to a+5 as given in the census and where the summation in the numerator spans ages 15–49 in five-year age groups (Shryock and Siegel, 1973:295). The singulate mean age at marriage reflects the life history of a hypothetical cohort who experience proportions single at each age as given in a survey or census, in this case the 1970 Census. For intermediate years we calculate SMAM using age-specific proportions single interpolated in the same way as age-specific proportions married, described above.

Decomposition of the change in the total fertility rate (TFR) between 1960–64 and 1965–69, with one set of additive components from changes in age-specific proportions married and a second set from changes in age-specific marital fertility, is calculated using an adaptation of a method developed by Kitagawa (1955), as follows:

Consider a change in TFR = $5 \sum_a F_a$, where F_a is the age-specific birth rate for a five-year age group beginning at age a. Assuming that all births occur within marriage, we can also write TFR = $5 \sum_a k_{am} F_{am}$, where k_{am} is the proportion of women currently married in the age group a to a+5 and F_{am} is the marital fertility rate in the same age group. Then

$$\Delta \mathrm{TFR} = 5 \sum_a \bar{F}_{am} \Delta k_{am} + 5 \sum_a \bar{k}_{am} \Delta F_{am} , \tag{4}$$

where the symbol Δ denotes change and where $\bar{F}_{am}$ and $\bar{k}_{am}$ are average values over the period, obtained by summing beginning and end values and dividing by 2. We thus obtain a sum of two principal contributions to ΔTFR, the first of which can be interpreted as stemming from changes in age-specific proportions married and the second from changes in age-specific marital fertility. Each of these two principal contributions can in turn be classified by age if so desired.

ESTIMATES

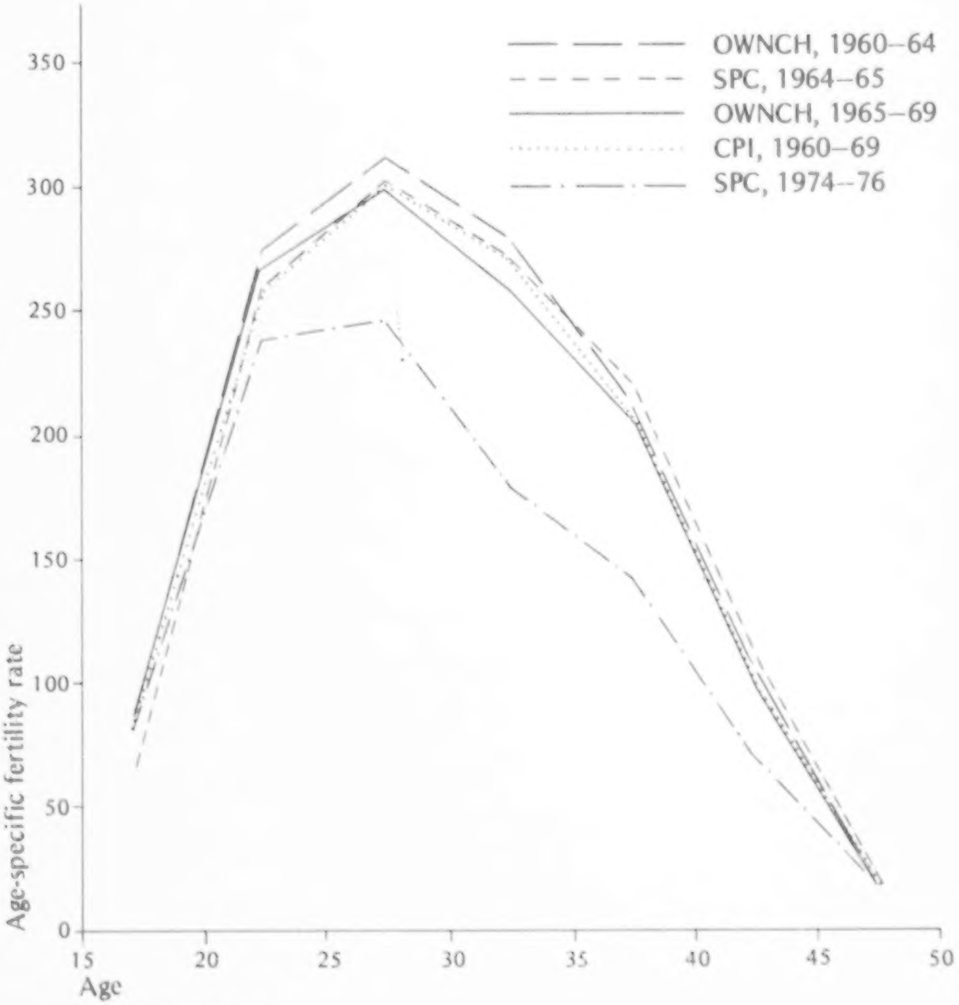
Fertility for Thailand and regions by rural-urban residence

Table 3 shows own-children fertility estimates for 1960–64 and 1965–69 compared with other fertility estimates for years since 1960. The trend in total fertility rates is remarkably consistent, indicating that fertility fell slowly over the 1960s, then swiftly after 1970. Estimates of age-specific rates do not show as consistent a trend as do estimates of the TFR, but the picture is still broadly clear.

Figure 3 graphs the trend in age-specific fertility as given by own-children estimates for 1960–64 and 1965–69, cohort-parity-increment (CPI) estimates based on data on children-ever-born from the 1960 and 1970 Censuses (Hill, 1978), and Survey of Population Change (SPC) estimates for 1964–65 and 1974–76. The five sets of estimates, all based on large samples, show little change during the early 1960s, moderate change during the late 1960s, and rapid change during the first half of the 1970s. The age pattern of fertility derived from the Longitudinal Study (LS) for 1971–72 is somewhat irregular and not shown in Figure 3. The age pattern of fertility derived from the Survey of Fertility in Thailand (SOFT) for 1970–74 shows an unusually low proportion of total fertility between ages 20 and 30 and is not shown either. Fertility estimates from the LS and SOFT surveys are based on small samples and are probably not as accurate as the own-children and SPC estimates.

Table 4 shows own-children and SPC estimates of total fertility rates and age-specific birth rates for the four regions of Thailand—North, Northeast, Central, and South. Fertility decline is most dramatic in the North, where the TFR fell from somewhat over six chil-

FIGURE 3 Age-specific birth rates for Thailand based on the Surveys of Population Change for 1964–65 and 1974–76 and on application of the own-children method to the 1970 Census



SOURCE: Table 3.

dren per woman in 1960–64 to somewhat under four children per woman in 1974–76. Fertility decline was especially rapid after about 1965, as noted also by Pardthaisong (1978). The Central region, which includes Bangkok, shows a similar, if somewhat less dramatic, pattern of fertility decline.

Fertility decline is much less noticeable in the Northeast and South. According to the own-children estimates, fertility actually increased slightly over the 1960s in the Northeast. The SPC 1974–76 estimates indicate that by the mid-1970s fertility had begun to fall rapidly in the Northeast. Since the fertility decline in the Northeast started from a very high initial level, close to seven children per woman, its rapid decline to approximately six children per woman during the first half of the 1970s still left it at a level achieved by the North and Central regions already in the early 1960s. Fertility in the South was between six and six and a half children per woman in the early 1960s and was still at about that level in the mid-1970s.

Table 5 shows the age pattern of fertility decline for each region over the 1960s, as given by the percentage change in each age-specific birth rate estimated by the own-children method. The North, Northeast, and South regions and Thailand as a whole approach the expected pattern, with relative declines for the most part larger at the older reproductive ages. In the Northeast and South, where total fertility hardly changed at all, age-specific fertility increased in the younger reproductive ages and fell at the older reproductive ages, a pattern frequently seen in developing countries. The Central region, on the other hand, shows a very different pattern, with the largest declines occurring at the younger and middle reproductive ages. By the mid-1970s, however, fertility in this region was falling rapidly at the older ages, too, as shown previously in Table 4.

Table 6 shows own-children estimates of total fertility rates for rural and urban areas of the four regions for 1960–64 and 1965–69. Rural-urban fertility differentials were already large in the early 1960s. In Thailand as a whole, urban women were already having about one and a half fewer children than rural women. This was also true of the Central region, where most of the country's urban population is concentrated. In the other three regions urban women were having about one child fewer than rural women.

It was shown in Table 5 that total fertility fell by about 5 percent between the first and second halves of the 1960s. Table 6 shows that this fertility decline was heavily concentrated in urban areas. In Thailand as a whole, the rural TFR fell by less than 3 percent over this

TABLE 3 Total fertility rates and age-specific birth rates: Thailand, various dates and sources
(Rates per thousand)

Source	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
NESDB, 1960	6,416	53	261	316	278	232	115	28
OWNCH, 1960–64	6,483	86	274	313	281	215	106	20
SPC, 1964–65	6,299	66	259	303	273	222	112	24
CPI, 1960–69	6,170	80	253	301	272	208	101	19
SOFT, 1965–69	6,460	90	260	300	260	210	140	30
OWNCH, 1965–69	6,191	89	267	299	260	206	100	19
LS, 1968–69	6,100	70	260	290	230	200	150	30
NESDB, 1970	5,598	60	226	256	254	202	96	26
LS, 1971–72	5,350	70	230	290	180	170	120	30
SOFT, 1970–74	5,090	80	230	230	190	170	80	30
SPC, 1974–76	4,895	81	239	247	182	143	70	18

SOURCES: OWNCH values refer to own-children estimates based on the 1970 Census as reported in this paper. NESDB refers to the National Economic and Social Development Board, SPC to the Survey of Population Change, CPI to Hill's (1978) cohort parity increment method as applied to the 1960 and 1970 Censuses, SOFT to the Survey of Fertility in Thailand, and LS to the Longitudinal Study conducted by the Institute of Population Studies at Chulalongkorn University. NESDB values are taken from Thailand, National Economic and Social Development Board (1975). SPC values are taken from Thailand, National Statistical Office (1976, 1978)—the SPC for 1964–65 omitted Bangkok-Thonburi. LS values are taken from Institute of Population Studies and National Statistical Office (1977); values are given to only two significant figures. SOFT values are taken from Thailand, National Statistical Office (1978); values are given to only two significant figures. Total fertility rates are calculated from more exact values of age-specific fertility rates than those shown.

TABLE 4 Total fertility rates and age-specific birth rates for regions of Thailand: comparison of estimates based on the own-children method to estimates based on the Survey of Population Change

(Rates per thousand)

Region and source	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
North								
OWNCH, 1960–64	6,364	96	291	306	270	200	91	17
SPC, 1964–65	6,475	94	282	305	278	221	96	18
OWNCH, 1965–69	5,712	93	264	273	236	185	77	15
SPC, 1974–76	3,744	70	178	195	151	100	46	8
Northeast								
OWNCH, 1960–64	6,971	86	287	334	303	236	122	27
SPC, 1964–65	6,605	62	259	318	292	232	123	35
OWNCH, 1965–69	7,204	99	307	340	304	246	121	24
SPC, 1974–76	6,249	99	320	297	228	191	92	23
Central								
OWNCH, 1960–64	6,055	75	253	297	266	203	100	17
SPC, 1964–65	5,902	47	241	305	238	219	108	22
OWNCH, 1965–69	5,324	66	222	266	225	178	91	16
SPC, 1974–76	4,113	74	202	206	150	116	62	13
South								
OWNCH, 1960–64	6,524	102	268	310	279	218	109	19
SPC, 1964–65	6,014	72	257	256	280	208	120	10
OWNCH, 1965–69	6,480	114	269	309	272	208	106	18
SPC, 1974–76	6,124	95	309	307	229	172	88	25

NOTE: The SPC figures in this table exclude Bangkok-Thonburi from the Central region.

TABLE 5 Own-children estimates of total fertility rates and age-specific birth rates: Thailand and regions, 1960–64 and 1965–69

(Rates per thousand)

Region and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Thailand								
1960–64	6,483	86	274	313	281	215	106	20
1965–69	6,191	89	267	299	260	206	100	19
% change	−4.5	2.9	−2.7	−4.5	−7.5	−4.4	−6.6	−8.3
North								
1960–64	6,364	96	291	306	270	200	91	17
1965–69	5,712	93	264	273	236	185	77	15
% change	−10.2	−3.9	−9.1	−10.9	−12.9	−7.7	−15.6	−12.4
Northeast								
1960–64	6,971	86	287	334	303	236	122	27
1965–69	7,204	99	307	340	304	246	121	24
% change	3.3	15.7	6.9	1.9	0.3	4.2	−1.0	−10.1
Central								
1960–64	6,055	75	253	297	266	203	100	17
1965–69	5,324	66	222	266	225	178	91	16
% change	−12.1	−12.2	−12.1	−10.2	−15.3	−12.5	−9.2	−4.1
South								
1960–64	6,524	102	268	310	279	218	109	19
1965–69	6,480	114	269	309	272	208	106	18
% change	−0.7	12.3	0.5	−0.1	−2.4	−5.0	−3.4	−5.9

NOTE: Percentage changes are computed from more exact rates than are shown in this table.

TABLE 6 Own-children estimates of total fertility rates by rural-urban residence: Thailand and regions, 1960–64 and 1965–69

(Rates per thousand)

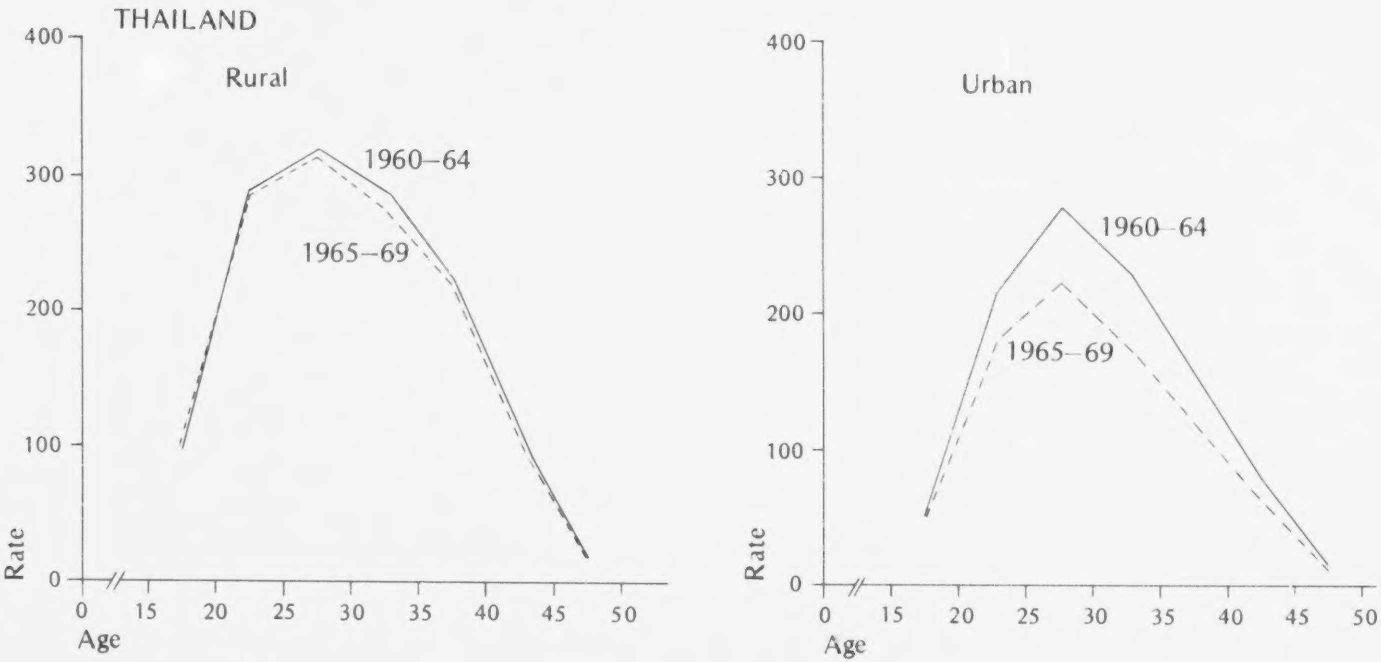
Region and period	Rural	Urban
Thailand		
1960–64	6,700	5,167
1965–69	6,545	4,146
% change	−2.3	−19.7
North		
1960–64	6,412	5,263
1965–69	5,793	4,201
% change	−9.7	−20.2
Northeast		
1960–64	6,968	6,036
1965–69	7,235	5,439
% change	3.8	−9.9
Central		
1960–64	6,651	4,968
1965–69	6,130	3,881
% change	−7.8	−21.9
South		
1960–64	6,611	5,783
1965–69	6,677	4,904
% change	1.0	−15.2

period, whereas the urban TFR fell by about 20 percent. In the North and Central regions, the rural TFR fell by almost 10 percent and the urban TFR by about 20 percent. In the Northeast and South, the rural TFR increased slightly and the urban TFR fell by 10–15 percent. Thus urban fertility was falling in all parts of the country during the 1960s, and rural fertility was starting to fall in the North and Central regions. The age pattern of fertility decline in rural areas in the four regions, based on estimates presented in Table A4, is shown in Figure 4.

Marital fertility and proportions married for Thailand and regions

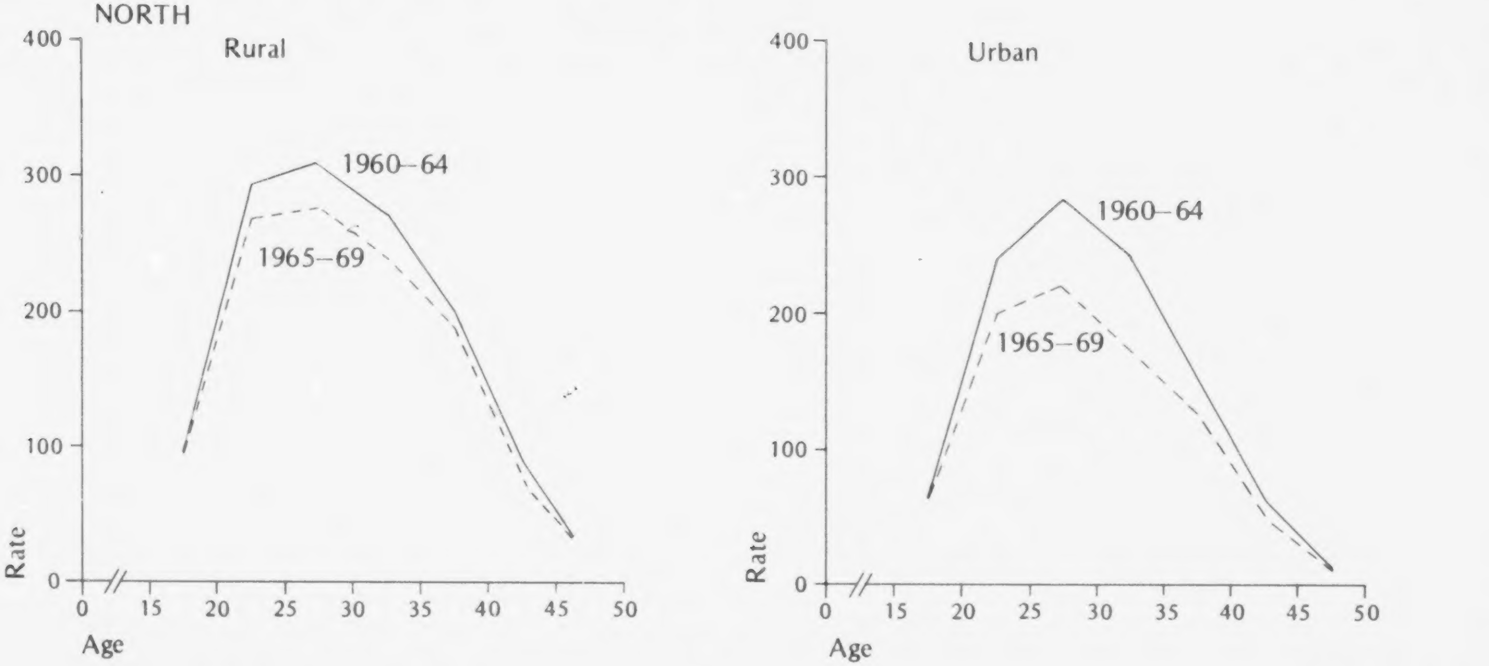
Table 7 shows own-children estimates of standardized marital general fertility rates (SMGFRs) and age-specific marital birth rates for

FIGURE 4 Own-children estimates of age-specific birth rates by rural-urban residence: Thailand and regions, 1960–64 and 1965–69
(Rates per thousand)



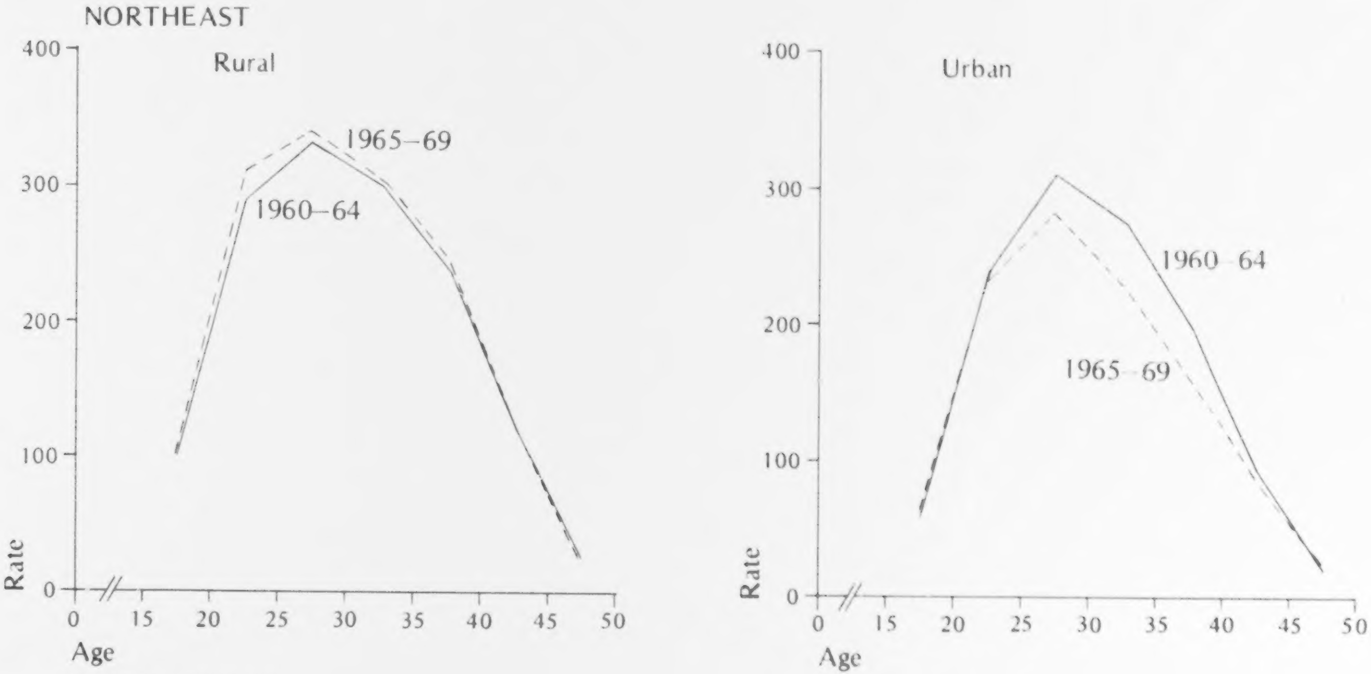
SOURCE: Table A4.

FIGURE 4 *(continued)*



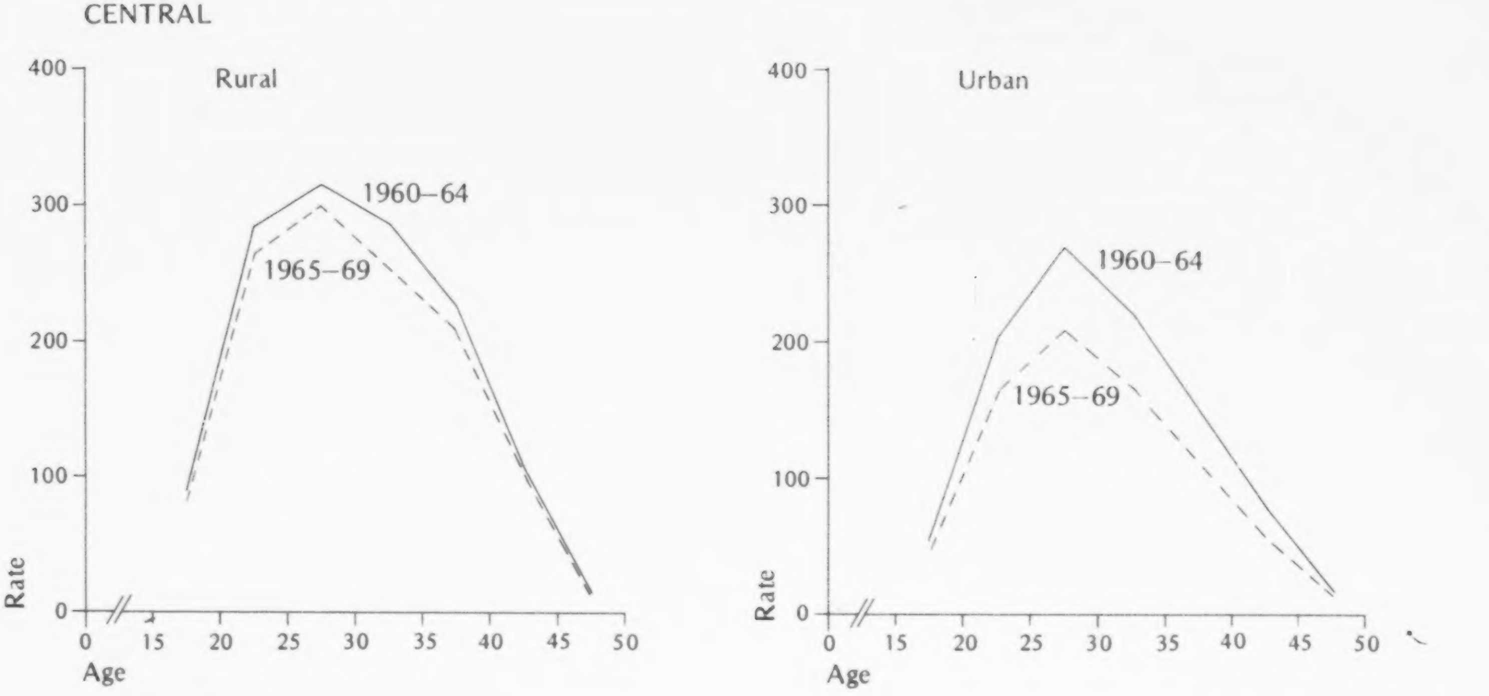
SOURCE: Table A4.

FIGURE 4 *(continued)*



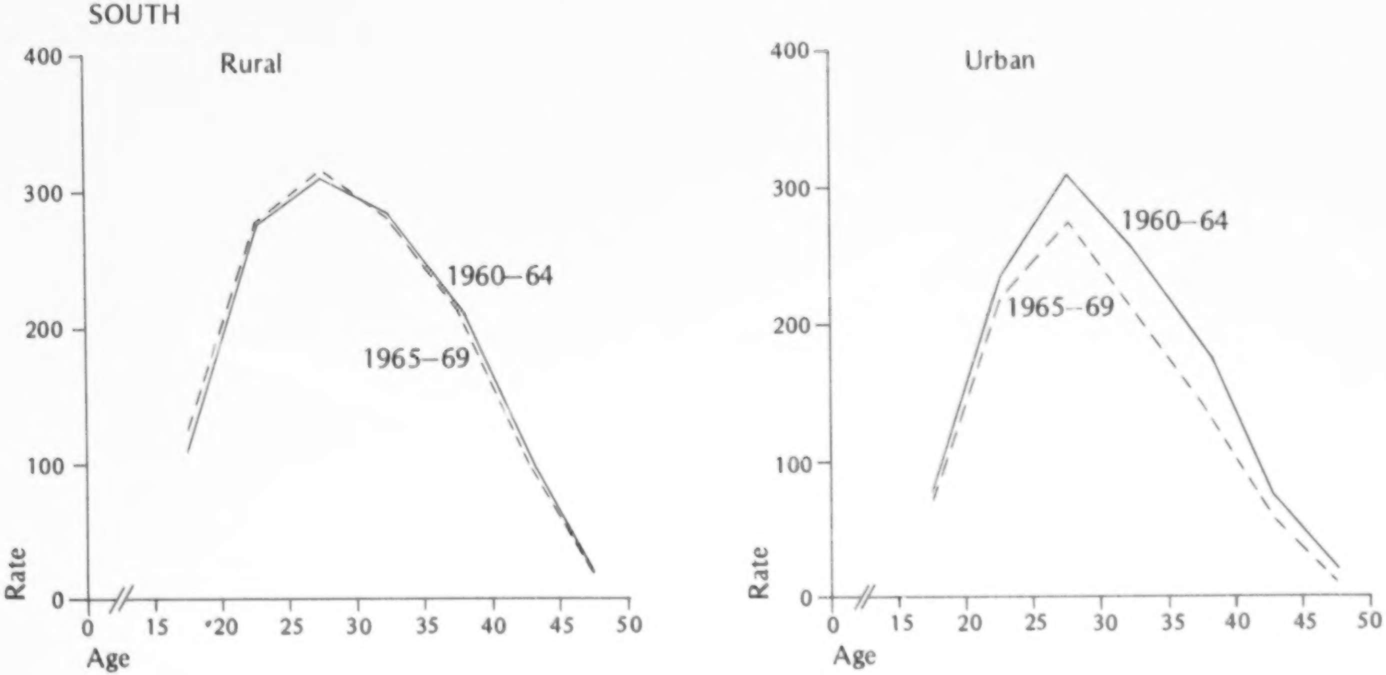
SOURCE: Table A4.

FIGURE 4 *(continued)*



SOURCE: Table A4.

FIGURE 4 *(continued)*



SOURCE: Table A4.

TABLE 7 Own-children estimates of standardized marital general fertility rates and age-specific marital birth rates: Thailand and regions, 1960–64 and 1965–69

(Rates per thousand)

Region and period	SMGFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Thailand								
1960–64	305	507	470	392	327	250	129	26
1965–69	293	513	460	376	303	238	119	24
% change	–4.0	1.2	–2.0	–4.0	–7.4	–4.9	–8.1	–9.9
North								
1960–64	284	467	447	366	307	229	109	22
1965–69	256	457	411	327	267	209	90	18
% change	–9.7	–2.2	–8.1	–10.8	–13.2	–8.6	–17.1	–14.4
Northeast								
1960–64	324	543	476	410	351	274	148	35
1965–69	329	570	489	414	350	283	144	31
% change	1.5	5.1	2.7	0.9	–0.4	3.4	–2.7	–11.8
Central								
1960–64	310	544	502	398	320	242	124	22
1965–69	281	503	470	367	274	212	111	21
% change	–9.3	–7.4	–6.4	–7.7	–14.3	–12.4	–10.3	–6.7
South								
1960–64	288	439	428	375	316	246	128	23
1965–69	288	493	434	377	308	234	123	22
% change	0.2	12.4	1.6	0.4	–2.3	–5.2	–4.4	–8.1

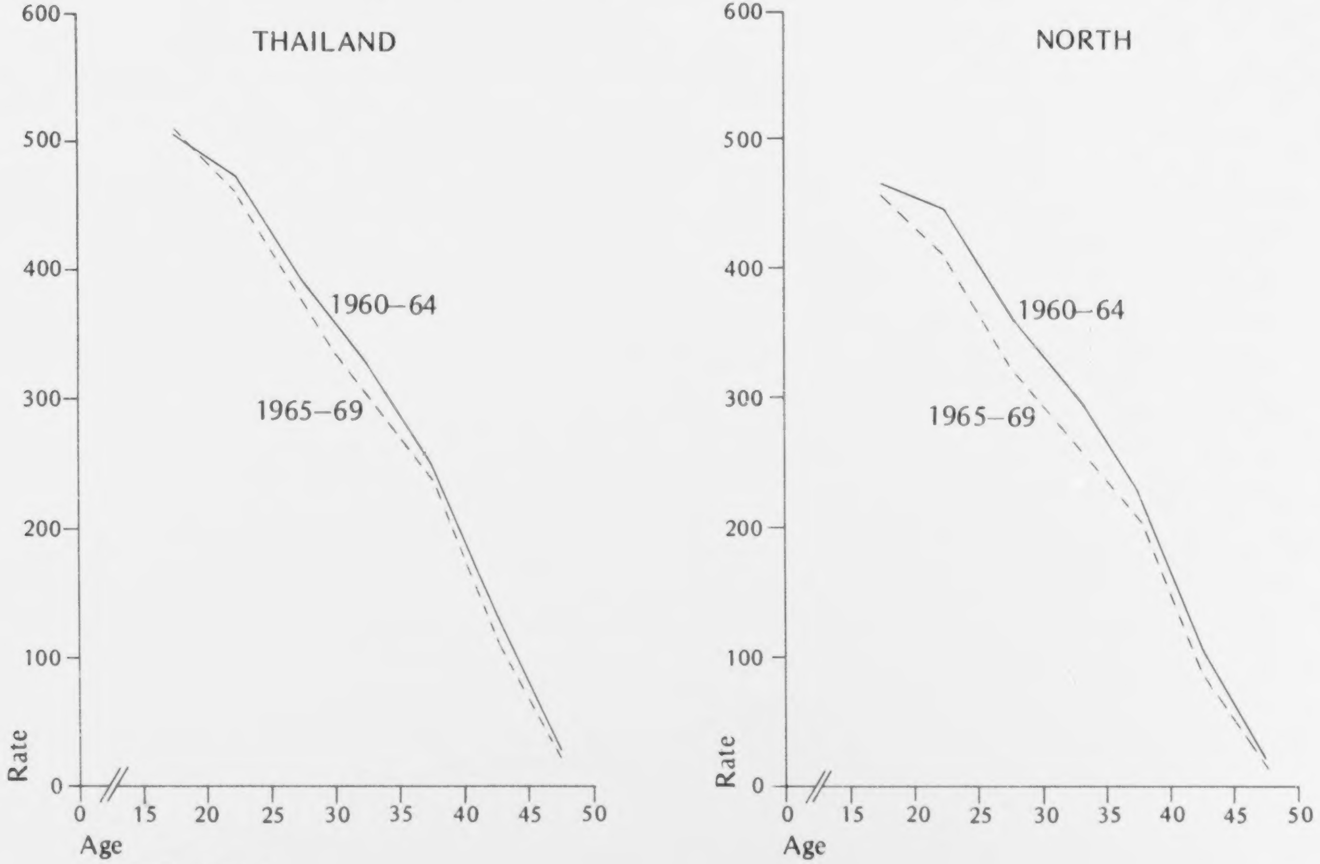
Thailand and regions. The SMGFR, like the TFR in Table 5, fell by about 4 percent over the 1960s in Thailand as a whole. In the North and Central regions, it fell about 10 percent, and in the Northeast and South it rose very slightly. The age pattern of marital fertility change generally shows larger relative declines with increasing age, but again the Central region is a minor exception. The age pattern of change in marital fertility is very much like the age pattern of change in overall fertility, because, as we shall see momentarily, nuptiality changed little over the 1960s. The age pattern of marital fertility change is shown graphically in Figure 5.

Age-specific marital birth rates in Table 7 are computed by dividing age-specific birth rates in Table 5 by age-specific proportions married in Table 8, as described in the previous section on data and methodology. (Computations are based on more exact values than shown in the latter two tables.) Table 8 confirms that changes in nuptiality over the 1960s were extremely small. Mean age at marriage was already fairly late, by Asian standards, at the beginning of the decade and remained approximately static. The age profile of proportions married is shown graphically in Figure 6.

Table 9 shows decompositions of the change in the total fertility rate between 1960–64 and 1965–69 for Thailand and regions, computed according to the methodology described earlier. The decompositions show the percentage of the change due to changes in age-specific proportions married and the percentage due to changes in age-specific marital fertility. Each of these two contributions is in turn decomposed by age. The total unpercentaged change in the TFR per thousand women is shown in parentheses at the lower right of each of the five panels.

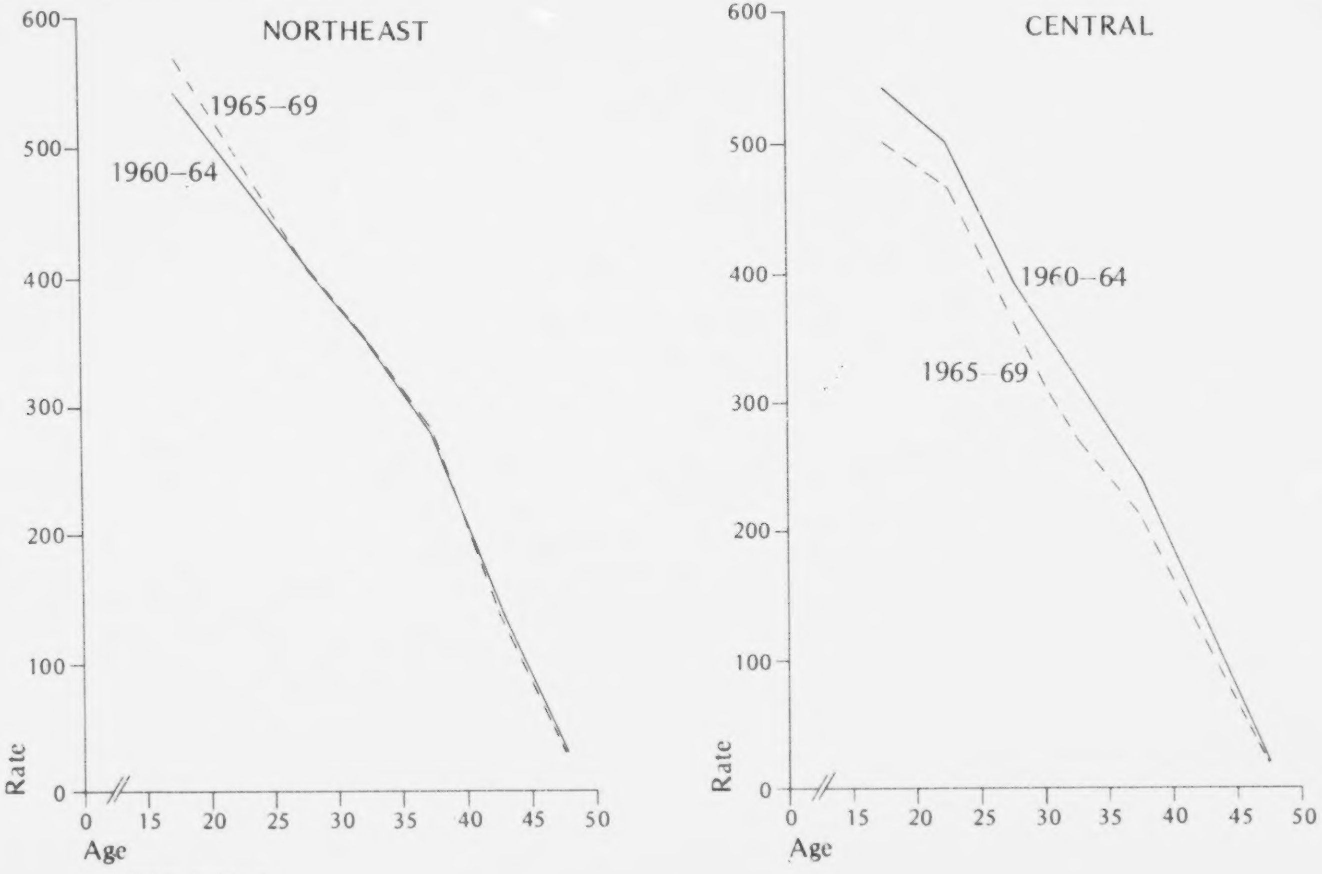
For Thailand as a whole, virtually all the change in the TFR is due to changes in marital fertility. Contributions from changes in age-specific proportions married are slightly positive at the younger ages (i.e., positively contributing to the decline) and negative at the older ages, with the net effect close to zero. The North shows a rather similar pattern. On the other hand, the Central region, which experienced a fall in the TFR similar in magnitude to that of the North, shows close to 20 percent of the change in the TFR due to changes in proportions married. The reason for the regional difference in decompositions is that in the Central region, but not in the North, the small declines in proportions married are most pronounced at 20–24 and 25–29, ages of very high marital fertility. Because contributions to change in the TFR from changes in age-specific proportions married

FIGURE 5 Own-children estimates of age-specific marital birth rates: Thailand and regions, 1960–64 and 1965–69 (Rates per thousand)



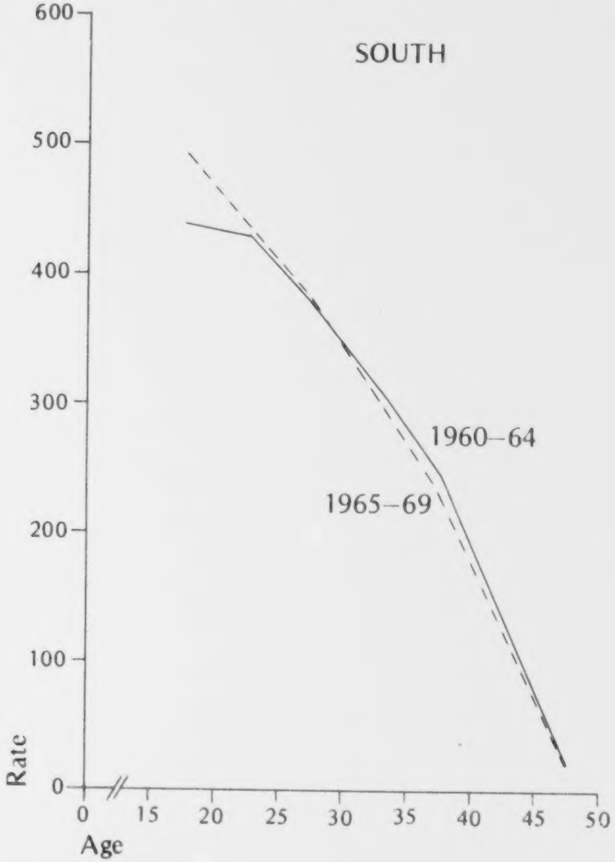
SOURCE: Table 7.

FIGURE 5 *(continued)*



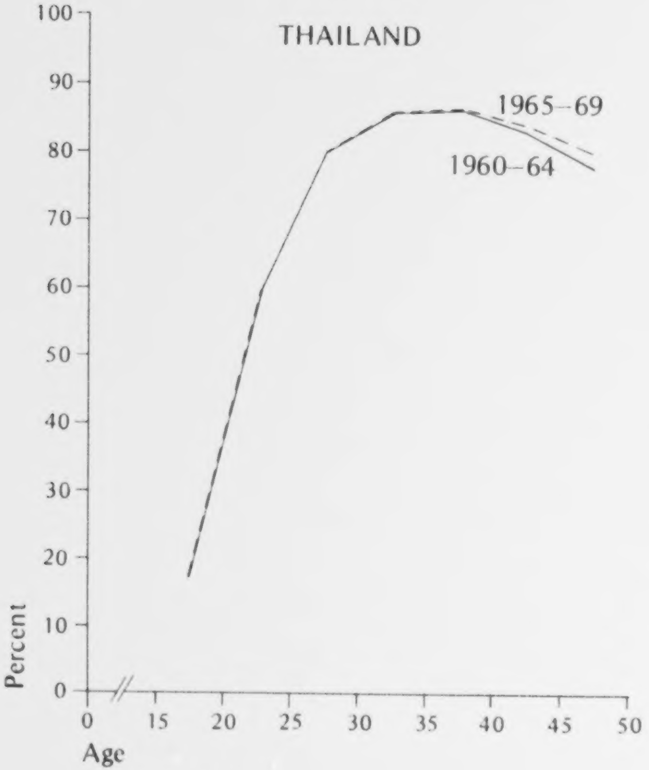
SOURCE: Table 7.

FIGURE 5 *(continued)*



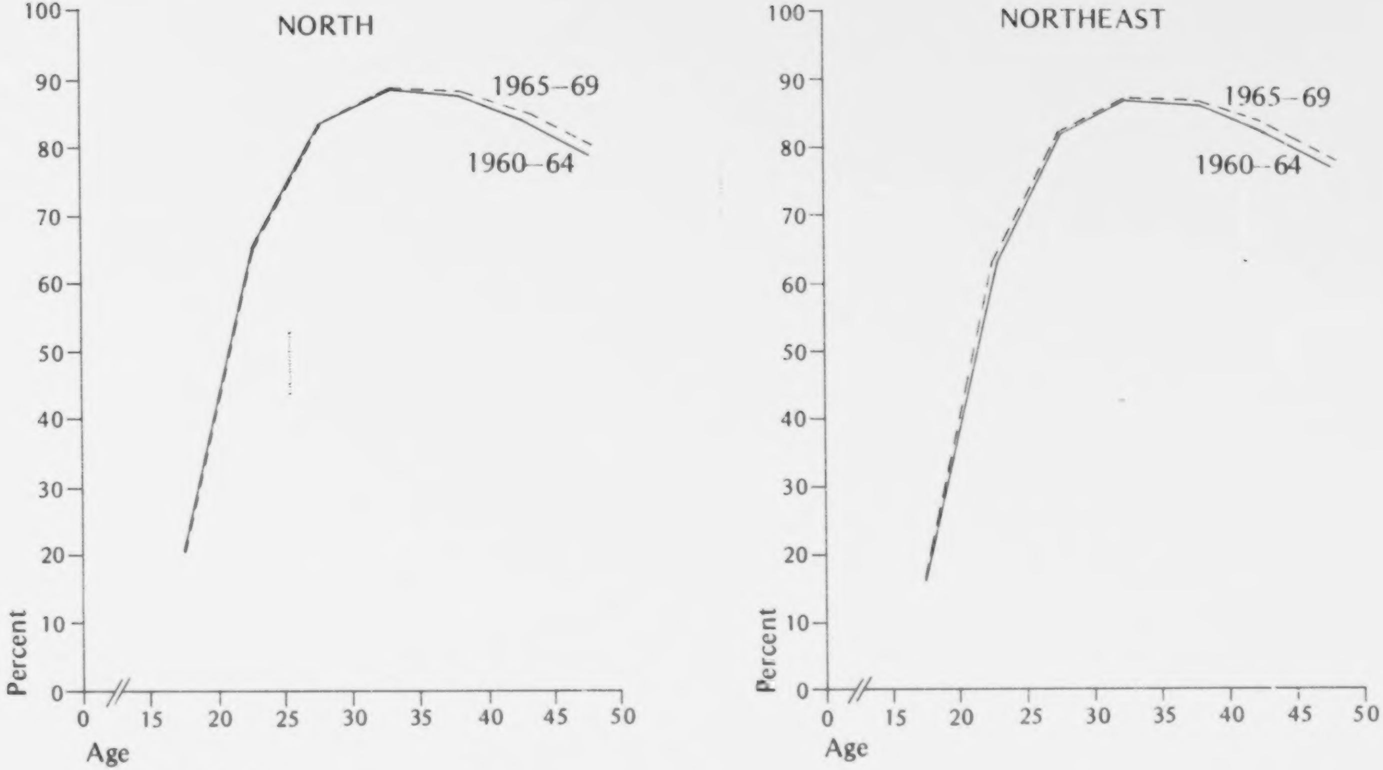
SOURCE: Table 7.

FIGURE 6 Age-specific proportions married: Thailand and regions, 1960–64 and 1965–69 (In percentages)



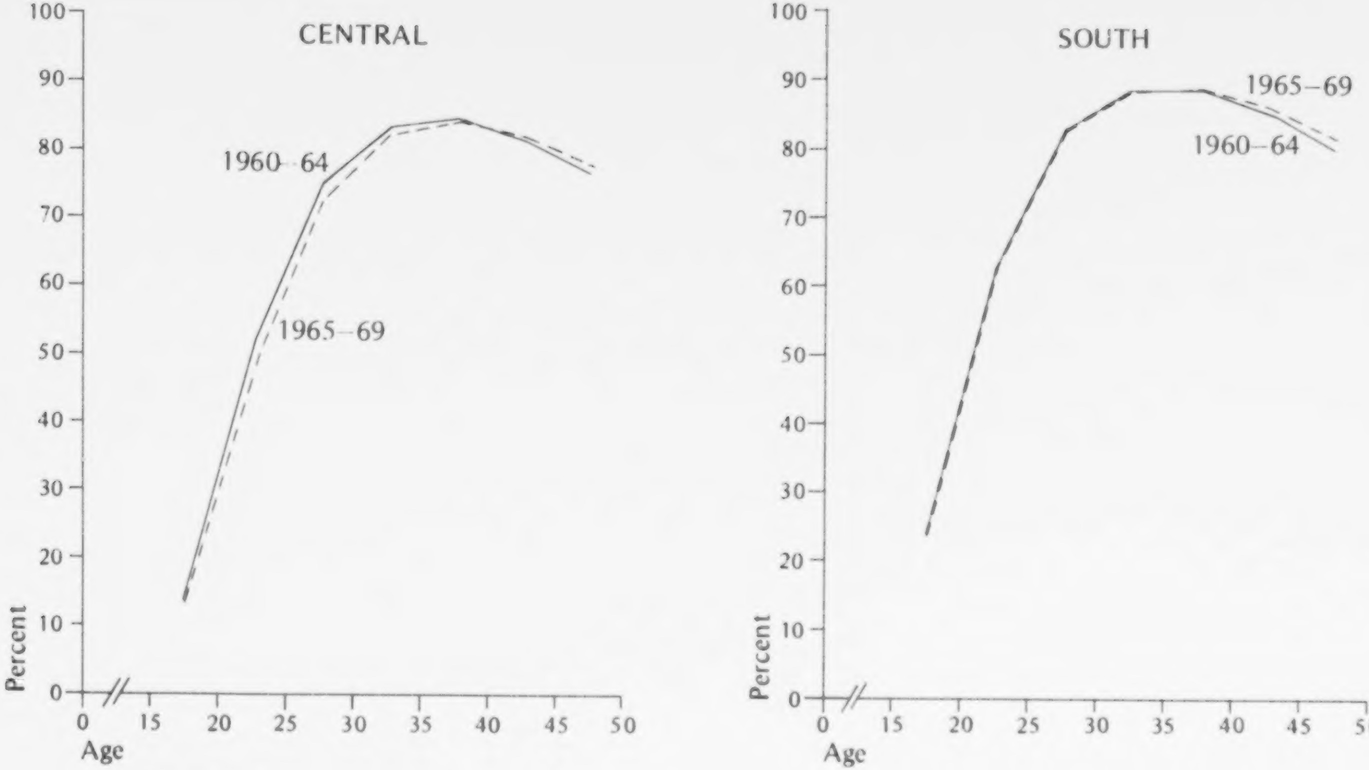
SOURCE: Table 8.

FIGURE 6 *(continued)*



SOURCE: Table 8.

FIGURE 6 *(continued)*



SOURCE: Table 8.

TABLE 8 Singulate mean age at marriage (SMAM) and age-specific proportions currently married (in percentages): Thailand and regions, 1960–64 and 1965–69

Region and period	SMAM	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Thailand								
1960–64	21.7	17.0	58.4	79.9	85.9	86.1	82.6	77.5
1965–69	21.8	17.3	58.0	79.4	85.8	86.5	83.9	79.2
North								
1960–64	20.8	20.6	65.0	83.7	88.1	87.4	83.9	78.7
1965–69	21.0	20.3	64.3	83.6	88.4	88.2	85.4	80.6
Northeast								
1960–64	21.4	15.8	60.3	81.3	86.4	86.1	82.2	77.0
1965–69	21.3	17.4	62.8	82.1	87.0	86.8	83.6	78.5
Central								
1960–64	22.5	13.8	50.4	74.6	83.0	84.1	81.2	76.3
1965–69	22.5	13.1	47.3	72.6	82.0	84.0	82.1	78.1
South								
1960–64	21.1	23.2	62.6	82.6	88.4	88.7	85.2	79.8
1965–69	21.2	23.2	61.9	82.2	88.3	88.8	86.2	81.6

are weighted by mean age-specific marital birth rates at the same ages (equation [4] of the previous section), small changes in proportions married at ages 20–24 and 25–29 translate into somewhat larger contributions to the change in the TFR.

In the Northeast the TFR increased by about two-tenths of a child; changes in proportions married contributed about two-thirds of the increase, and changes in marital fertility about one-third. The percentaged contribution from proportions married is large because proportions married rose, albeit slightly, at all ages, instead of rising at some ages and falling at others, and because marital fertility hardly changed. In the South the TFR fell very slightly, by less than one-twentieth of a child, with about one-third of the decline due to changes in proportions married, and two-thirds due to changes in marital fertility. Since the change in the TFR on which components are percentaged is so small, there are large offsetting effects in the percentaged contributions, which are sensitive to small variations in the input data. Because of this sensitivity, not much significance can be attached to precise numerical magnitudes of contributions for the South.

Fertility by characteristics

As mentioned earlier, an advantage of the own-children method is that it allows tabulation of birth rates by characteristics asked on the census form. In this paper we consider three women's characteristics known generally to have a strong influence on fertility—namely education, occupation, and religion.

Table 10 shows estimates of total and age-specific fertility by education and rural-urban residence for Thailand during 1960–64 and 1965–69. Results are presented for four education categories—no education, some primary, some secondary, and some college. Birth rates for rural women with some college are omitted from the table, because births to these women at the extremes of the reproductive age span are too few in number to yield reliable estimates of age-specific rates. Fertility differentials by education are extremely large, ranging from slightly over two children per woman for urban women with some college, to almost seven children per woman for rural women with some primary education. The latter women are just beginning fertility transition, whereas the former have virtually completed it and show little fertility change over the decade.

Overall, women with some primary education have slightly higher total fertility than women with no education, although this difference disappears by the latter half of the decade. When rural and urban women are disaggregated, however, a somewhat different picture emerges. In rural areas, fertility increased slightly over the decade for those with no education and fell slightly for those with some primary education. The changes were small enough, however, that women with some primary education preserved consistently higher total fertility than women with no education. In urban areas, on the other hand, women with some primary education show consistently lower total fertility than women with no education.

These findings suggest that in rural areas neither of the two educational groups, no education or some primary, practiced birth control to any significant extent over the 1960s, although birth control apparently took hold among women with more than a primary education. In the absence of birth control, those with some primary education, who are generally better off, better nourished, and more fecund than those with no education, have more children than those with no education. In urban areas, on the other hand, fertility fell rapidly over the decade among both those with no education and those with some primary. Evidently both educational groups had recourse to birth control; in the presence of birth control, those with more education are further down the road of fertility decline, as expected. The higher educational groups, some secondary and some college, which also had recourse to birth control and lowered their fertility over the decade, are consistently characterized by the usual inverse relationship between education and fertility in both rural and urban areas.

Table 10 throws light on earlier findings in Table 6. In Table 6 we saw that rural total fertility hardly fell at all during the 1960s, whereas urban total fertility, already about 1.5 children per woman lower than rural total fertility to begin with, fell substantially, by about one child per woman. Table 10 shows that rural fertility rose for those with no education, fell slightly for those with some primary education, and fell substantially for those with some secondary education. Since women with some secondary education were a very small proportion of all rural women, however, the substantial fall in their fertility had only a slight impact on the average fertility of all rural women. In urban areas, on the other hand, fertility fell in all educational strata over the decade, adding up to a very substantial overall urban fertility decline.

Specification of birth rates by education adds to our understanding of rural-urban differences in fertility decline, but it does not explain away those differences in any simple sense. Some threshold effects appear to be operating which led to rapid adoption of birth control in urban areas in the 1960s but not in rural areas until the 1970s. Education plays an important role in these threshold effects, but that role is complex and mediated by other factors (Retherford, 1979).

Own-children estimates of total and age-specific fertility by women's occupation are shown in Table 11. Rural-urban distinctions are omitted, because most rural persons are included in the farmers and miners category. Fertility differentials and trends by occupation are generally consistent with fertility differentials and trends by education, discussed earlier. Professional, technical, and administrative workers, with the most education, have the lowest fertility, between two and three children per woman. Farmers and miners, with the least education, have the highest fertility, close to seven children per woman. Clerical and sales workers, who include large numbers of street vendors, also have high fertility, about four to five children per woman. The fertility of skilled, unskilled, and service workers is somewhat lower, about three to four children per woman. Farmers and miners show little change in fertility over the decade, whereas the other three occupational groups, primarily urban in character, show substantial fertility decline, ranging from 0.5 to 1.3 children per woman. These differences in fertility trends by occupation are consistent with the earlier finding that rural fertility fell little and urban fertility fell substantially over the decade.

Table 12 shows estimates of total and age-specific fertility by religion and rural-urban residence. Buddhists show the highest fertility, followed by Muslims and Christians, whose average fertility over the decade was about the same. Buddhist fertility declined slightly over the decade, and Muslim fertility changed virtually not at all. Christian fertility increased. When each religious group is separated into rural and urban subgroups, it is found that rural fertility changed little or increased, and urban fertility, starting from considerably lower levels, declined substantially. Rural Buddhist fertility declined very slightly, and rural Muslim fertility remained unchanged. Rural Christian fertility anomalously increased by more than one child, to almost eight children. Why this should be so is unclear, but the increase is consistent over all age groups except the last. Urban fertility fell in all three religious groups, but less so for Muslims, for whom it was higher to begin with, than for the others. TFR differentials by religion for rural and urban combined narrowed over the decade.

CONCLUSION

Own-children estimates of fertility levels, trends, and differentials

TABLE 9 Percentage decomposition of the change in the total fertility rate between 1960–64 and 1965–69: Thailand and regions

Region and change component	15–19	20–24	25–29	30–34	35–39	40–44	45–49	All age groups
Thailand								
Proportions married	–2.5	3.0	3.3	0.5	–1.7	–2.7	–0.7	–0.8
Marital fertility	–1.8	9.5	21.0	35.7	18.1	14.8	3.5	100.8
Both components	–4.3	12.5	24.3	36.2	16.4	12.1	2.8	100.0 (–292)
North								
Proportions married	1.2	2.4	0.4	–0.7	–1.4	–1.2	–0.3	0.6
Marital fertility	1.6	17.9	25.3	27.4	13.2	12.1	1.9	99.4
Both components	2.9	20.3	25.7	26.7	11.9	10.9	1.6	100.0 (–652)
Northeast								
Proportions married	19.1	25.4	7.4	4.7	3.9	4.4	1.1	65.9
Marital fertility	10.0	17.0	6.2	–2.6	17.2	–7.0	–6.8	34.1
Both components	29.1	42.4	13.6	2.1	21.2	–2.6	–5.8	100.0 (233)
Central								
Proportions married	2.6	10.1	5.3	2.0	0.2	–0.8	–0.3	19.1
Marital fertility	3.7	10.8	15.4	25.8	17.2	7.1	0.8	80.9
Both components	6.3	20.9	20.7	27.9	17.4	6.3	0.5	100.0 (–730)
South								
Proportions married	0.8	33.8	18.4	3.2	–4.4	–14.8	–4.5	32.5
Marital fertility	–142.4	–48.0	–15.6	71.9	128.5	56.1	17.1	67.5
Both components	–141.6	–14.2	2.8	75.1	124.1	41.3	12.5	100.0 (–44)

TABLE 10 Own-children estimates of total fertility rates and age-specific birth rates by education and rural-urban residence: Thailand, 1960–64 and 1965–69

(Rates per thousand)

Education, rural-urban residence, and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
NO EDUCATION								
Rural and urban								
1960–64	6,563	133	282	302	269	206	101	19
1965–69	6,469	144	279	297	266	197	92	18
% change	−1.4	8.3	−0.8	−1.9	−1.0	−4.4	−8.9	−5.2
Rural								
1960–64	6,568	135	282	299	269	208	102	19
1965–69	6,579	149	282	299	272	201	94	18
% change	0.2	10.8	0.0	0.0	1.3	−3.0	−8.2	−5.7
Urban								
1960–64	6,395	116	276	329	270	181	90	18
1965–69	5,373	88	248	274	220	152	74	18
% change	−16.0	−23.7	−10.3	−16.5	−18.2	−15.7	−17.7	−2.8
SOME PRIMARY								
Rural and urban								
1960–64	6,777	87	284	322	292	227	118	25
1965–69	6,466	91	283	308	264	216	110	21
% change	−4.6	4.9	−0.6	−4.2	−9.3	−5.1	−7.3	−15.3
Rural								
1960–64	6,961	89	290	327	298	236	126	26
1965–69	6,715	94	290	318	276	227	116	22
% change	−3.5	5.3	0.2	−2.8	−7.5	−3.9	−7.2	−16.0
Urban								
1960–64	5,537	72	242	287	239	167	81	19
1965–69	4,621	74	223	240	179	128	65	15
% change	−16.5	1.9	−7.8	−16.5	−25.2	−23.4	−19.4	−19.0

TABLE 10 *(continued)*

Education, rural-urban residence, and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
SOME SECONDARY								
Rural and urban								
1960–64	3,327	19	137	212	139	110	42	6
1965–69	2,754	16	125	184	110	69	43	4
% change	−17.2	−16.8	−8.3	−13.3	−21.0	−37.6	1.4	−28.6
Rural								
1960–64	5,095	20	177	282	173	229	138	0
1965–69	3,886	18	164	231	133	118	112	0
% change	−23.7	−8.2	−7.4	−17.9	−22.9	−48.5	−18.7	0.0
Urban								
1960–64	3,002	20	123	200	137	80	32	8
1965–69	2,471	16	110	171	109	58	24	5
% change	−17.7	−20.5	−10.8	−14.2	−20.2	−27.9	−24.0	−33.3
SOME COLLEGE								
Rural and urban								
1960–64	2,231	3	48	149	125	89	31	2
1965–69	2,002	1	21	131	150	59	34	5
% change	−10.3	−76.9	−57.5	−11.8	20.0	−33.1	8.8	206.7
Rural[a]								
Urban								
1960–64	2,245	2	31	145	148	84	37	2
1965–69	1,921	1	22	127	150	61	18	6
% change	−14.4	−66.7	−30.9	−12.7	1.9	−26.5	−51.5	143.5

[a] Figures for college educated women in rural areas are omitted because of insufficient numbers.

TABLE 11 Own-children estimates of total fertility rates and age-specific birth rates by occupation: Thailand, 1960–64 and 1965–69
(Rates per thousand)

Occupation and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
Professional, technical, and administrative								
1960–64	2,986	10	102	177	148	103	52	5
1965–69	2,442	11	70	162	119	82	43	2
% change	−18.2	11.5	−31.7	−8.9	−19.4	−20.0	−17.3	−66.7
Clerical and sales								
1960–64	5,321	60	221	278	239	171	80	16
1965–69	4,052	56	155	204	179	136	71	10
% change	−23.8	−5.9	−30.2	−26.5	−25.1	−20.6	−11.1	−35.0
Skilled, unskilled, and service								
1960–64	4,673	50	188	240	212	152	73	18
1965–69	3,366	37	129	165	147	121	59	15
% change	−28.0	−26.1	−31.1	−31.4	−30.6	−20.9	−19.6	−19.6
Farmers and miners								
1960–64	6,839	92	289	321	293	230	119	24
1965–69	6,674	96	290	318	281	223	107	20
% change	−2.4	3.2	0.5	−1.1	−4.1	−2.8	−10.1	−14.3

over the decade of the 1960s, based on the 1970 Census, appear broadly consistent with other published estimates. Total fertility for the whole country declined slightly from about 6.5 to 6.2 children per woman between 1960–64 and 1965–69. All four regions showed total fertility rates between six and seven children per woman for 1960–64. By 1965–69 total fertility had fallen by somewhat over half a child in the North and Central regions, remained almost unchanged in the South, and increased slightly in the Northeast.

Levels and trends differ greatly between rural and urban areas. For the country as a whole, rural total fertility was close to seven children per woman in 1960–64 and declined very slightly to about 6.5 by 1965–69. Urban total fertility, which was about 1.5 children lower than rural total fertility to begin with in 1960–64, fell substantially by about one child, from approximately five to four children. Rural total fertility fell by about one-half child in the North and Central regions and rose slightly in the Northeast and South. Urban fertility fell substantially in all four regions, from about five to four children in the North and Central regions, and from about six to five children in the Northeast and South.

Nuptiality patterns changed little over the decade. Age at marriage was already high, about 22 years for women, and showed little tendency to increase further. Therefore, trends in marital fertility closely parallel trends in overall fertility. Decomposition of the decline in the total fertility rate for the whole country between 1960–64 and 1965–69 allocates almost all of the change to marital fertility decline and almost nothing to changes in age-specific proportions married. Exceptions to this allocation pattern occur for geographic subdivisions where fertility change was small; in such cases, larger relative contributions from changes in proportions married can and do occur.

Among rural women, those with no education slightly raised their fertility between 1960–64 and 1965–69, perhaps because of improved nutrition and fecundity, and those with primary education slightly reduced their fertility. Rural women with more than a primary education showed a substantial fertility decline, but they were too small a proportion of all rural women to have much impact on overall rural fertility. Among urban women, fertility declined substantially in all educational strata.

A complementary pattern emerged in fertility estimates by occupation, which showed slight fertility decline among farmers and miners, with total fertility close to seven children per woman, and large fertility declines in the urban occupational groups. The lowest fertility levels were found among professional, technical, and administrative workers, whose total fertility was between two and three children per woman.

Fertility differentials by religion show Buddhists with the highest fertility, followed by Muslims and Christians slightly lower at about the same level. Buddhist fertility declined slightly over the decade, Muslim fertility remained unchanged, and Christian fertility increased. In rural areas, Buddhist fertility fell slightly, Muslim fertility stayed constant, and Christian fertility, for some unexplained reason, rose substantially, to almost eight children. In urban areas, fertility fell in all three religious groups, but more for Buddhists and Christians than for Muslims.

Overall, it appears that fertility transition in Thailand was well under way in urban areas in the 1960s, with sizable fertility declines occurring in all major socioeconomic groups. But by the latter half of the decade fertility control was just beginning in rural areas, most noticeably in the North and Central regions. Rural women with more than primary education reduced their fertility over the decade, but the mass of rural women did not.

TABLE A3 Adjustment factors for underenumeration and age misreporting in the Thailand 1970 Census

Age group[a]	Arnold and Phananiramai	Fulton
0–4	1.113	1.096
5–9	1.015	0.986
15–19	1.017	1.017
20–24	1.187	1.086
25–29	1.082	1.041
30–34	0.933	1.070
35–39	0.968	1.039
40–44	1.032	1.070
45–49	1.121	1.063
50–54	1.048	1.060
55–59	1.057	1.080

[a] Adjustment factors for ages 0–4 and 5–9 pertain to children of both sexes. Adjustment factors for subsequent age groups pertain only to women.

SOURCE: Arnold and Phananiramai (1975) and Fulton (1975).

TABLE 12 Own-children estimates of total fertility rates and age-specific birth rates by religion and rural-urban residence: Thailand, 1960–64 and 1965–69
(Rates per thousand)

Religion, rural-urban residence, and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
BUDDHIST								
Rural and urban								
1960–64	6,514	84	276	316	283	217	107	20
1965–69	6,213	86	269	300	261	208	100	19
% change	–4.6	2.5	–2.5	–4.9	–7.7	–4.4	–7.0	–6.0
Rural								
1960–64	6,740	90	287	322	291	226	111	20
1965–69	6,579	94	287	315	275	221	105	19
% change	–2.4	3.7	–0.2	–2.4	–5.4	–2.2	–5.1	–4.9
Urban								
1960–64	5,147	54	210	279	231	158	80	18
1965–69	4,108	50	177	222	176	121	60	15
% change	–20.2	–6.9	–15.7	–20.3	–23.7	–23.5	–24.8	–16.3
MUSLIM								
Rural and urban								
1960–64	6,068	132	268	268	247	188	85	26
1965–69	6,005	146	253	273	242	177	91	20
% change	–1.0	10.9	–5.6	1.9	–2.1	–6.0	6.6	–24.0

Rural								
1960–64	6,104	135	269	267	248	191	85	26
1965–69	6,113	154	256	275	247	180	92	19
% change	0.1	13.9	−4.8	3.0	−0.4	−5.8	7.7	−26.8
Urban								
1960–64	5,784	107	256	276	243	165	83	27
1965–69	5,193	93	230	255	203	150	82	26
% change	−10.2	−13.7	−10.1	−7.4	−16.5	−8.9	−2.0	−2.9
CHRISTIAN								
Rural and urban								
1960–64	5,864	64	258	296	224	174	128	29
1965–69	6,196	90	232	353	250	190	115	9
% change	5.7	40.1	−9.8	19.1	12.1	9.3	−10.4	−70.2
Rural								
1960–64	6,463	80	290	309	227	194	154	39
1965–69	7,695	126	300	411	296	233	162	10
% change	19.1	57.1	3.5	33.2	30.5	20.2	5.7	−74.6
Urban								
1960–64	5,151	45	207	291	230	156	93	8
1965–69	4,141	37	155	261	186	128	54	7
% change	−19.6	−18.3	−25.2	−10.2	−18.8	−18.2	−41.7	−16.0

TABLE A1 Abridged life table for males in Thailand: Survey of Population Change, 1964–65

Age group	$_nq_a$	ℓ_a	$_nd_a$	$_nL_a$	T_a	e_a
0	.09539	100,000	9,539	93,323	5,593,806	55.9
1–4	.04109	90,461	3,717	339,452	5,500,483	60.8
5–9	.01898	86,744	1,646	429,765	5,161,031	59.5
10–14	.01168	85,098	994	422,979	4,731,266	55.6
15–19	.01238	84,104	1,041	418,072	4,308,287	51.2
20–24	.01731	83,063	1,438	412,034	3,890,215	46.8
25–29	.02021	81,625	1,650	404,412	3,478,181	42.6
30–34	.02339	79,975	1,871	395,560	3,073,769	38.4
35–39	.03095	78,104	2,417	384,873	2,678,209	34.3
40–44	.04815	75,687	3,644	369,949	2,293,336	30.3
45–49	.04791	72,043	3,452	352,245	1,923,387	26.7
50–54	.06478	68,591	4,443	332,560	1,571,142	22.9
55–59	.07526	64,148	4,828	309,487	1,238,582	19.3
60–64	.10807	59,320	6,411	281,555	929,095	15.7
65–69	.16143	52,909	8,541	244,728	647,540	12.2
70–74	.27643	44,368	12,265	191,941	402,812	9.1
75 and over	1.00000	32,103	32,103	210,871	210,871	6.6

NOTE: Revised by National Statistical Office, 26 January 1978.

TABLE A2 Abridged life table for females in Thailand: Survey of Population Change, 1964–65

Age group	$_nq_a$	ℓ_a	$_nd_a$	$_nL_a$	T_a	e_a
0	.07534	100,000	7,534	94,726	6,203,892	62.0
1–4	.03975	92,466	3,676	347,448	6,109,166	66.1
5–9	.01490	88,790	1,323	441,000	5,761,718	64.9
10–14	.01337	87,467	1,169	434,573	5,320,718	60.8
15–19	.00931	86,298	803	429,412	4,886,145	56.6
20–24	.01991	85,495	1,702	423,631	4,456,733	52.1
25–29	.01805	83,792	1,512	415,385	4,033,102	48.1
30–34	.02163	82,280	1,780	407,323	3,617,717	44.0
35–39	.01716	80,500	1,381	399,133	3,210,394	39.9
40–44	.02871	79,119	2,272	390,378	2,811,261	35.5
45–49	.03245	76,847	2,494	378,452	2,420,883	31.5
50–54	.03109	74,353	2,312	366,403	2,042,431	27.5
55–59	.05813	72,041	4,188	350,460	1,676,028	23.3
60–64	.07842	67,853	5,321	326,843	1,325,568	19.5
65–69	.12246	62,532	7,658	294,652	998,725	16.0
70–74	.23893	54,874	13,111	242,706	704,073	12.8
75 and over	1.00000	41,763	41,763	461,367	461,367	11.0

NOTE: Revised by National Statistical Office, 2 October 1974.

TABLE A4 Own-children estimates of total fertility rates and age-specific birth rates by rural-urban residence: Thailand and regions, 1960–64 and 1965–69

(Rates per thousand)

Region, rural-urban residence, and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
THAILAND								
Rural								
1960–64	6,700	92	286	319	288	224	110	21
1965–69	6,545	96	284	312	273	218	105	19
% change	−2.3	4.1	−0.4	−2.1	−5.2	−2.4	−4.6	−7.2
Urban								
1960–64	5,167	55	211	279	232	158	80	18
1965–69	4,146	51	178	224	177	122	61	15
% change	−19.7	−7.2	−15.6	−19.6	−23.4	−22.8	−24.2	−15.1
NORTH								
Rural								
1960–64	6,412	98	293	307	271	203	93	17
1965–69	5,793	94	268	275	239	188	79	15
% change	−9.7	−4.1	−8.5	−10.3	−11.8	−7.4	−15.3	−11.1
Urban								
1960–64	5,263	62	238	284	241	150	64	14
1965–69	4,201	64	199	222	168	126	51	10
% change	−20.2	2.6	−16.2	−21.7	−30.4	−15.4	−19.8	−32.9
NORTHEAST								
Rural								
1960–64	6,968	87	287	332	302	236	122	27
1965–69	7,235	101	309	340	305	247	121	24
% change	3.8	16.0	7.4	2.4	0.9	4.9	−0.7	−11.2

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Mehtab S. Karim

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TABLE A4 *(continued)*

Region, rural-urban residence, and period	TFR	15–19	20–24	25–29	30–34	35–39	40–44	45–49
NORTHEAST *(continued)*								
Urban								
1960–64	6,036	58	238	313	278	204	98	18
1965–69	5,439	64	231	284	230	164	88	25
% change	–9.9	10.8	–2.8	–9.1	–17.1	–19.7	–9.3	35.7
CENTRAL								
Rural								
1960–64	6,651	90	283	315	289	227	109	17
1965–69	6,130	79	261	300	255	208	105	17
% change	–7.8	–12.4	–7.7	–4.6	–11.7	–8.4	–3.6	0.6
Urban								
1960–64	4,968	52	202	270	222	150	81	18
1965–69	3,881	46	163	210	169	114	59	15
% change	–21.9	–11.2	–19.0	–22.1	–23.8	–24.0	–27.3	–14.9
SOUTH								
Rural								
1960–64	6,611	106	272	310	282	222	112	18
1965–69	6,677	121	276	315	280	215	110	18
% change	1.0	14.2	1.4	1.5	–0.6	–3.0	–1.8	–1.1
Urban								
1960–64	5,783	76	231	308	254	187	81	20
1965–69	4,904	70	217	272	206	140	64	11
% change	–15.2	–8.3	–6.0	–11.5	–18.6	–25.0	–21.2	–44.1

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PREFACE

Thanks are due to Drs. J. Mayone Stycos, Peter C. Smith, and Samuel H. Preston for their valuable comments on an earlier draft of this paper. Support for the publication of this paper was provided by the Office of Population, Agency for International Development.

ABSTRACT Using data from the 1968–69 Pakistan National Impact Survey and multiple classification analysis, this paper examines the relationship between age at marriage and fertility among 1,114 currently married women 15–44 years of age who were living in urban areas at the time of the survey. Mean age at marriage reported by the sample was very low (16 years), although among younger women it was somewhat higher (17 and a half). Average cumulative fertility among older women (those aged 35–44 when interviewed) was 6.7 births, but it was 29 percent lower among women who had married at age 19 or later than among those who had married at age 16 or earlier, even though women who had postponed marriage had a faster tempo of childbearing. Cumulative fertility differentials were found among socioeconomic groups, ethnic groups, and residential (metropolitan versus nonmetropolitan) groups who married at younger and older ages.

Duration of marriage and first pregnancy interval proved to be important predictors of the inverse relationship between age at marriage and cumulative fertility. With duration of marriage controlled, cumulative fertility was 14 percent lower among late-marrying women than among those who had married early; with first pregnancy interval controlled, cumulative fertility was 32 percent lower among late-marrying women.

Raising the mean age at marriage for Pakistani women to 19 from the current legal age of 16 would have beneficial social, as well as demographic, effects. But because the early marriage age appears to be related, at least among some ethnic groups, to the economic liability of daughters, increasing the legal age at marriage must be accompanied by fundamental changes in women's roles.

The fertility of a population is determined by a number of interrelated social, economic, and demographic factors. Especially in areas where fertility is high, female age at marriage has important implications for the study of fertility, because the length of the female reproductive period is largely determined by the age at which a woman enters marital union. Coale and Tye (1961) have pointed out that early marriage could be one of the major determinants of fertility; they suggest, however, that the fecundity of women married at a very early age may be impaired by premature pregnancy. Malthus recognized the importance of the age at which women marry and suggested that delayed marriage was one important way to reduce population growth (Leasure, 1963). Davis (1955) identified certain values prevalent in non-Western societies, such as universality of marriage and emphasis on early marriage for women, along with the joint family system, as the major factors contributing to higher fertility. Though no significant differences in fertility have been reported among women living in joint or nuclear families in Pakistan (Karim, 1974), it appears quite likely that a low average age at marriage may account in part for Pakistan's high fertility. This paper attempts to relate the fertility of urban Pakistani women to their ages at marriage and to identify sociocultural and economic factors influencing this relationship. The religious support given to universal and early marriage in Pakistan, as well as such social values as segregation of the sexes, strong taboos against premarital sex, and a large-family norm may contribute to the low age at marriage as well as to the high fertility of women in Pakistan.

Historically, a well-established inverse relationship between a woman's age at marriage and her fertility has existed throughout the world. In the recent past, however, this association seems to have become substantially weaker in the developed countries. For example, Glass and Grebenik (1954) have emphasized the decreasing importance of age at marriage in predicting fertility in Britain. They argue that age at marriage and fertility are not tightly linked for the more recently married women owing to their adoption of birth control. But Busfield (1972) has shown that these differences persist even in recent marriage cohorts. Her study explores a number of reasons for this persistence.

Differences in fertility by age at marriage have remained relatively large in societies where marriage is universal, average age at marriage is low, and the use of contraception is not very common. Numerous studies done in India have demonstrated an inverse relationship between age at marriage and fertility. Driver (1963), for example, relating the high fertility of central Indian women to their low age at marriage, reported that, at the completion of their childbearing period, women who married at age 18 or later were 30 percent less fertile than those who married before age 14. On the basis of a set of calculations using the stable population concept, Agarwala (1967) suggested that if female age at marriage in India were raised from 15.6 years to 19.3 years on the average, there would be a decline of 27 percent in the birth rate. Malakar (1972) reported a consistent inverse relationship between age at marriage and fertility in India based on different fertility measures. Although he indicated that no significant decline in fertility would result from raising age at marriage from 15 to 17 years, a substantial decline would occur, if it were raised to 19 or 21 years. Talwar and Seal (1974) reached results somewhat similar to those of Malakar. But they suggested that decline in fertility resulting from an increase in age at marriage might not be significant in the long run. On the other hand, Das (1967) did not find a significant impact of an increase in age at marriage on fertility and suggested the existence of a critical line below which the postponement of marriage does not have a bearing on completed family size.

The results of studies conducted elsewhere generally suggest a significant impact of female age at marriage on fertility. Leasure (1963), comparing Bolivian and Turkish data, showed that a substantial decline in fertility would result if average age at marriage were increased to 27 or 28 years in those countries. Siffman (1967) noted high marital fertility rates of 8.5 and 9.1 among women in Armenia and Azerbaijan in the Soviet Union prior to the Second World War; and he related these rates to a low average age at marriage of about 17 years. Kim et al. (1974) considered age at marriage as the most important factor in explaining fertility decline in Korea during the past two decades among currently married women 40–49 years old. Palmore and Marzuki (1969), using West Malaysian survey data, suggested that early marriage leads to higher cumulative fertility whereas the nonexposure associated with multiple marriage tends to retard completed family size. They found that fertility, as well as age-at-marriage differentials by rural-urban residence, ethnicity, and education of women, shows a clear impact of age at marriage on completed family size.

In Pakistan, despite the low average age at marriage and high fertility, little research has been done on the relationship between these two variables. Using available census data on marital status by age, Sadiq (1965) prepared estimates of singulate mean age at marriage (SMAM). He reported an increase of over four years in SMAM during the past half century, as shown in Table 1. A sudden increase in SMAM in the 1940s was mainly the result of social and political disturbances during the decade. But the increase in the 1960s seems to have been due to economic and social changes. (For a detailed discussion of trends in nuptiality in Pakistan see Karim, 1979.)

On the basis of 1961 Census data, Ahmed (1969) estimated the effect on the crude birth rate of an assumed increase in the minimum age at marriage for females in Pakistan from the minimum legal age at marriage of 16 years to 20 years. He concluded that such an increase

TABLE 1 Singulate mean age at marriage (SMAM): Pakistan, 1921–72

Year	SMAM
1921	15.8
1931	15.7
1941	16.4
1951	17.9
1961	17.6
1968	19.6
1972	20.0

SOURCES: 1921–61: Sadiq (1965), based on Population Censuses of Pakistan. 1968: Pakistan, Statistical Division (1973). 1972: Pakistan, Census Organization (1974).

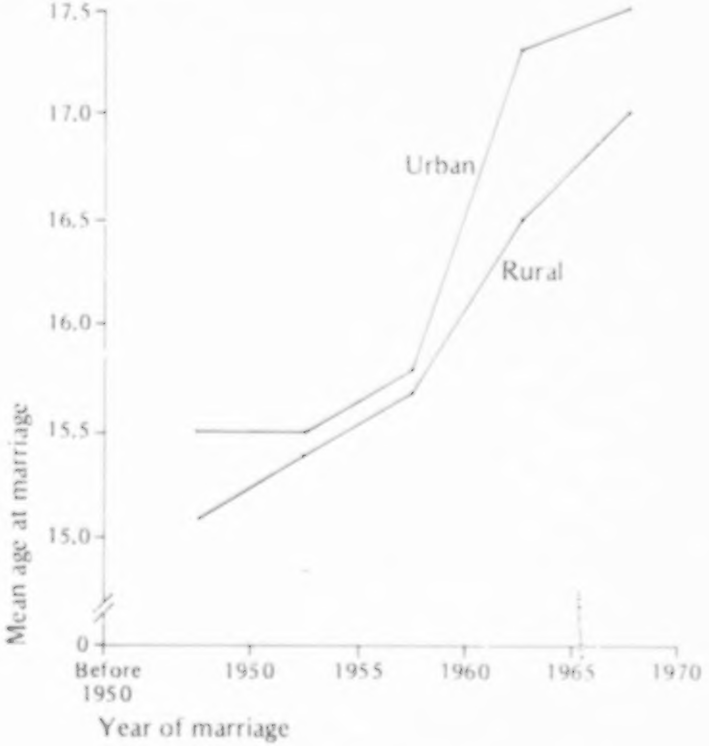
would have resulted in a maximum fertility decline of 12 percent between 1961 and 1971. Furthermore, he suggested that the crude birth rate would show an upward trend between 1976 and 1991 and would decline afterward as small-sized cohorts resulting from the increase in age at marriage began reproduction. Ahmed, however, assumed a *sudden* shift in age at marriage from 16 to 20 years; therefore, his results may not be entirely realistic, because changes in age at marriage in societies like Pakistan occur gradually. In a more recent study, De Tray (1977) has pointed out some of the problems associated with studying the relationship between age at marriage and fertility in Pakistan. Nevertheless, his regression results indicate a decline of 8 percent in completed fertility from raising the average age at marriage from 15.2 to 19.2 years.

PRESENT STUDY

A review of the literature strongly suggests that the age at marriage has a direct bearing on fertility. Most of the studies dealing with the age-at-marriage and fertility relationship have, however, ignored the social and cultural aspects of the relationship. They are usually "model" oriented, explaining the magnitude of expected decline in overall fertility with increases in age at marriage. They have largely failed to mention that a shift in age at marriage is an important cultural change, a change in traditional behavior relating to one of the most fundamental institutions in the society. It is likely to be indicative of other changes in attitudes toward marriage, as well as reproductive behavior.

A rise in age at marriage is one of the major factors that may cause a decline in fertility. This is especially true in societies like Pakistan, where not only are large-family norms prevalent but also contraceptive use is still very limited (Pakistan Population Planning Council, 1976). Age at marriage in Pakistan, as in many other modernizing societies, has shown an upward trend during the past decades. This increase is especially notable in urban areas (Smith and Karim, 1978). Figure 1 shows an increase of about two years in age at marriage for women married recently (four years prior to the survey) compared with those married for more than 20 years. It appears likely that, as in other countries, women who postpone their marriage for a few years will tend to have lower fertility.

FIGURE 1 Mean age at marriage by year of marriage, among currently married women: Pakistan, 1968–69



SOURCE: Pakistan, Family Planning Council (n.d.).

Data analyzed here are from the National Impact Survey, conducted in 1968–69, which represented the first attempt in Pakistan to collect social and demographic data at the national level. The survey covered about 2,500 households. Interviews were conducted with 2,910 currently married women under 45 years of age. (See Pakistan, Family Planning Council, n.d., for details.) Care was taken to record accurately the ages of women at the time they started living with their husbands instead of the ages at which they were married.[1] Nevertheless, the estimates of exact age at marriage may still have been biased by somewhat inaccurate age reporting as a result of memory lapses, especially among older women. Similarly, there were recall problems with answers concerning the total number of live births. As a result, some underreporting of cumulative fertility among older women was likely.

Because of the possibility that reports of current age, age at marriage, and number of live births were more accurate among urban than among rural women, only data for urban residents are analyzed here. Urban women are frequently able to relate vital events to some well-known and important occurrence in their lives owing to their greater exposure to the mass media and their relatively higher literacy. They may therefore provide more reliable information than their rural counterparts. The sample for this study consists of 1,114 currently married women of ages 15–44 who had married only once and were living in urban areas of Pakistan. Socioeconomic and demographic characteristics of the women selected for study are current age, level of education, husband's occupation, type of residence (metropolitan or nonmetropolitan), and mother tongue (as a proxy for ethnicity) because they are considered to be most likely to affect the relationship between age at marriage and cumulative fertility. In a multiple classification analysis, duration of marriage and first pregnancy interval are used as covariates to determine their effects on the relationship between age at marriage and cumulative fertility within three age groups.

FINDINGS AND DISCUSSION

Relationship of fertility to demographic and socioeconomic characteristics

An inverse relationship between age at marriage and fertility is indicated by the cumulative fertility measures in Tables 2 and 3, though

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[1] Respondents were asked: "What was your age when you first lived with your husband?" and number of years was recorded. Interviewers were instructed to probe for an estimate of each respondent's age using a date/event card and to specify the basis of each estimate.

TABLE 3 Total marital fertility rate, mean number of live births, mean number of pregnancies, and mean first pregnancy interval, by age at marriage: Pakistan, 1968–69

Fertility ratio (for specified current age groups)	Age at marriage 16 or less	17–18	19 or more	All ages
Marital total fertility rate (15–44)	7.9	6.7	6.0	7.6
Mean number of live births (40–44)	7.4	6.5	5.9	7.1
Mean number of pregnancies (40–44)	8.2	7.0	6.3	7.7
Mean interval between marriage and first conception, in months (15–44)	19.7	13.3	9.6	16.7
Number of women	724	202	188	1,114
Percentage	65.0	18.1	16.9	100.0

the age-specific rates are irregular. An average of 1.5 additional live births or an average of 1.9 additional pregnancies was reported by women aged 40–44 who married at age 16 or earlier as compared with those married at age 19 or later (Table 2). Similarly, there was a difference of 1.9 in the total marital fertility rate between women who married earlier and those marrying at later ages (Table 3). The findings indicate a reduction of 20 percent in the number of live births (in the age group 40–44), 23 percent in total pregnancies (in the same age group), and 24 percent in the marital total fertility rate among women married at age 19 or later compared with those married by age 16. However, in accordance with earlier findings (Rele, 1962), women marrying later tended, on the average, to have shorter first pregnancy intervals, averaging 9.6 months compared with 19.7 months for those marrying earlier. This difference of 10.1 months may be due partly to secondary sterility associated with early age at marriage. Thus, although the women in the sample tended to follow the large-family norm prevalent in Pakistani society irrespective of their age at marriage, those marrying later eventually ended up with an average of 1.5 fewer children than women marrying earlier. As will be shown, this is largely a result of a shortening of their reproductive period by an average of three years due to later marriage.

Table 4 presents the mean number of live births for women by selected demographic and socioeconomic characteristics within three broad age groups (15–24, 25–34, and 35–44 years) to allow for possible cohort effects. Age at marriage is shown to be an important predictor of fertility among women in each age group, and older women who reported marriage by age 16 show an excess of two live births over those married at age 19 or later. This finding suggests that, other things being equal, the average completed family size of the former group would have been 4.9 instead of 6.9 if their average age at marriage had been 19 instead of 16 years. In other words, those married at age 19 or later had 29 percent lower cumulative fertility than women married at age 16 or earlier. But women married at ages 17 and 18 had almost the same cumulative fertility as those married earlier, suggesting that age 19 may be a cutoff point in predicting fertility decline due to marriage delay.

As seen in Table 4, educational level influenced age at marriage and fertility. Women with more education who married at age 19 or later had, on the average, 2.7 fewer live births than those who married at age 16 or earlier and had three or less years of schooling. Similarly, women married to men in higher status occupations (professional and managerial) tended to be less fertile if married at a later age than if married earlier (the difference being 3.1 children). But wives of unskilled workers did not always have the highest cumulative fertility. This finding suggests that economic status has a complex influence on the cumulative fertility of older women, who tend to have the highest fertility.

Metropolitan versus nonmetropolitan residence may be one of the factors aiding changes in attitudes and thus leading to a higher mean age at marriage and to reductions in family size. Though women living in metropolitan areas reported higher cumulative fertility, those married at age 19 or later tended to have the lowest cumulative fertility: about two children fewer than the average woman and 2.7 fewer than their counterparts who married at age 16 or earlier.

Ethnic groups in Pakistan differ not only in the languages they speak; they also have their own traditions and subcultures, including different marriage practices and customs. Ethnic groups speaking Urdu and Punjabi are largely cosmopolitan and have lived for centuries close to Hindu (Indian) culture. Consequently, many of their traditions and customs are Hindu in origin. On the other hand, the Sindhi, Pushto, and Baluchi speaking populations are more traditional and closer to the Arab and Iranian cultures. Arabs entered the Indian subcontinent through Sind in the seventh century A.D., and the first foundation of

Arab and Islamic culture was laid there. Pushto and Baluchi speaking areas border on Iranian and Afghani areas, and people living there trace their origins to central Asia. One marriage custom widely practiced by the Sindhi, Pushto, and Baluchi groups is payment of a bride price. At the time of marriage negotiations, a bridegroom's family has to offer a bride price to the family of the bride as a security against divorce. On the other hand, among the Urdu and Punjabi speaking populations, who have a long affiliation and common ancestry with Hindus, it is customary for the bride to bring a dowry to the marriage from her family. This contrast in marriage practices may have a strong bearing on age at marriage and in turn on fertility within each marriage cohort.

Though the differences in the mean age at marriage among the three ethnic groups do not seem to be great, a somewhat lower cumulative fertility is noticed among those speaking Sindhi, Pushto, and Baluchi. Little difference was reported between women married at earlier and at later ages, though the very high fertility of those married at age 17 or 18 is quite conspicuous. Punjabi speaking women reported 2.6 fewer live births if married at age 19 or later than if married at the earliest ages. Among Urdu speaking women, those marrying at age 19 or later also reported lower fertility than those marrying at age 16 and earlier. A similar trend was observed for the youngest cohort in this language group.

Multiple classification analysis

So far we have looked at the differences in the mean number of live births among women in three age categories, married at different ages and having certain socioeconomic characteristics. In what follows, a closer look is taken at these relationships with the help of multiple classification analysis (MCA). Two demographic variables are introduced as covariates. An important aspect of the MCA technique is its capacity to show the effect of an independent variable, or predictor, on the dependent variable both before and after the effects of selected other variables, used as covariates, are taken into account. One useful statistic is the adjusted deviation from the grand mean (or the adjusted mean) for each category of the predictor. The adjusted means are estimates of what the mean levels of the dependent variable would have been if the subjects under study had been equally distributed according to the control variables (Andrews et al., 1973). Cumulative fertility is a function not only of the current age of a woman and her age at marriage, but also of the span of her reproductive period. In the analysis that follows the reproductive span is indexed by duration of marriage and first pregnancy interval. These variables are themselves only weakly correlated (see Table 5).

TABLE 5 Correlation matrix of socioeconomic and demographic characteristics, for currently married women aged 15–44 in urban Pakistan: 1968–69

Variable	(9)	(8)	(7)	(6)	(5)	(4)	(3)	(2)	(1)
1 Age at marriage	.32	.13	.08	.01	–.24	–.31	.02	–.21	
2 Number of live births	–.09	0	–.09	.05	.01	.73	.70		
3 Current age	–.06	.03	–.04	.06	.19	.92			
4 Duration of marriage	–.16	–.02	–.07	.06	.27				
5 First pregnancy interval	–.17	–.10	–.06	–.04					
6 Residence	.11	–.01	–.19						
7 Linguistic group	–.02	.01							
8 Husband's occupation	.24								
9 Woman's education									

Table 6 indicates the clear downward trend in fertility with age at marriage among younger women (col. 4). But when duration of marriage is introduced as a covariate in the MCA analysis (col. 5), the fertility difference between late-marrying and all women is reduced by one live birth. Similar findings are reported for the other two groups of younger women. On the other hand, the effect of controlling on the first pregnancy interval is to increase the age-at-marriage differential (col. 6). When the additive effects of duration of marriage and first pregnancy interval are considered simultaneously, 15 percent of the variance in number of live births is explained. This finding reflects the fact that there is some association between the two variables and a corresponding overlap in explanatory power, because R^2 with separate control for duration of marriage (.095) and for first pregnancy interval (.105) sum to a higher value than the combined R^2 when one takes into account both variables simultaneously. It may easily be seen that duration of marriage is an important factor in explaining the relationship between fertility and age at marriage, but first pregnancy interval does not affect this relationship to a great extent. However, duration of marriage and the first pregnancy interval are most important for the early years of childbearing, as shown in the third panel of Table 6.

Using duration of marriage and first pregnancy interval as constants, Figure 2 shows the effect of age at marriage on cumulative fertility. It plots the mean number of predicted live births for each age group and age-at-marriage category as if the women had had identical marriage durations and first pregnancy intervals. Whereas, among older women, the unadjusted difference in the mean number of live births is 29 percent, this difference is reduced to 14 percent after duration of marriage is accounted for. It rises slightly (to 32 percent) when first pregnancy interval is held constant. The combined effect of both variables indicates a difference of 16 percent in cumulative fertility between women married at age 16 or earlier and those married at age 19 or later. The data also indicate that when duration of marriage is held constant, there is virtually no difference in cumulative fertility among younger women at whatever age they married. Rather, women who married later tended to show higher cumulative fertility during their early reproductive period, which may be due to their shorter first and subsequent pregnancy intervals. Nevertheless, women who married at age 19 or later ultimately ended up with a completed family size of about one child less than those married at age 18 or younger.

The overall lower fertility among women who married at older ages, to the magnitude of 29 percent (and of 14 percent when duration of marriage is held constant), suggests that if female age at marriage in Pakistan were to increase to about 21 years, a substantial decline in fertility would occur, as has happened in other countries, such as the Republic of Korea (Kim et al., 1974). Because a very high proportion of women in our sample were married at age 16, an analysis of completed family size of women who married at age 21 or later has not been attempted. But age at marriage seems to be rising; whereas 76 percent of the older women (35–44) were married by age 16, only 62 percent of the younger women (15–34) were married by that age. Though the future fertility trend of younger women may not be correctly predicted, it is evident that younger women who postponed marriage are experiencing lower fertility than those who married at early ages. Thus, because a higher proportion of younger women are marrying at later ages, the cumulative fertility of the younger cohorts may ultimately be less than 6.6 births per woman, the rate reported for older women who married at early ages. Contraception may also play an important role in reducing cumulative fertility, even among younger women who have still not adopted any family planning method (Pakistan, Population Planning Council, 1976).

Earlier in this paper I noted a much lower cumulative fertility rate among women who married at age 19 or later, who had some higher

TABLE 2 Age-specific and total fertility rates, mean number of live births, and mean number of pregnancies, by current age of women: urban Pakistan, 1968–69

Index of fertility by age at marriage	Current age of women						
	15–19	20–24	25–29	30–34	35–39	40–44	All ages
Age-specific fertility rate							
All ages at marriage	.268	.395	.322	.253	.181	.095	269.3
16 or less	.281	.402	.337	.281	.179	.103	272.1
17–18	.250	.420	.200	.225	.192	.046	248.8
19 or more	0	.359	.337	.200	.190	.111	281.9
Mean number of live births							
All ages at marriage	.6	2.0	3.6	5.1	6.3	7.1	4.2
16 or less	.7	2.6	4.1	5.4	6.6	7.4	4.7
17–18	.4	1.8	3.1	5.0	6.8	6.5	3.9
19 or more	0	1.0	2.3	4.1	4.1	5.9	2.9
Mean number of pregnancies							
All ages at marriage	.7	2.3	4.0	5.6	7.0	7.7	4.7
16 or less	.8	2.9	4.6	6.0	7.4	8.2	5.2
17–18	.5	2.1	3.4	5.3	7.2	7.0	4.2
19 or more	0	1.2	2.6	4.5	4.8	6.3	3.4
Number of women	112	215	273	201	187	126	1,114
Percentage	10.1	19.3	24.5	18.0	16.8	11.3	100.0

SOURCE: Pakistan, Family Planning Council (n.d.), for this and subsequent tables.

TABLE 4 Mean number of live births by age at marriage and selected characteristics: currently married women in urban Pakistan

Age group and characteristics	Number of women (1)	Percentage of women (2)	Mean age at marriage (3)	Mean number of live births: To all women (4)	Mean number of live births: To women married at age: ≤16 (5)	17–18 (6)	≥19 (7)	Difference between mean number of live births for women married ≤16 and ≥19 ([5] – [7])[a] (8)	(9)
WOMEN 35–44 YEARS	313	100.0	15.9	6.6	6.9	6.7	4.9	2.0	29.0
Woman's education level									
≤3 years of schooling	268	85.6	15.7	6.8	7.0	6.8	5.2	1.8	25.7
≥4 years of schooling	45	14.4	17.3	5.8	6.5	5.9	4.3	2.2	33.9
Husband's occupation									
Unskilled	81	29.5	15.9	7.0	7.1	6.4	7.0	0.1	1.4
Clerical or skilled	99	36.0	15.7	6.7	7.0	6.1	5.3	1.7	24.3
Professional or managerial	95	34.5	16.5	6.5	7.0	7.4	3.9	3.1	44.3
Residence									
Nonmetropolitan	229	73.2	15.7	6.5	6.7	6.5	5.1	1.6	23.9
Metropolitan	84	26.8	16.4	6.8	7.4	7.2	4.7	2.7	36.5
Language									
Urdu	98	31.6	15.6	6.9	7.1	6.9	5.1	2.0	28.2
Punjabi	147	47.4	15.9	6.8	7.2	6.2	4.6	2.6	36.1
Sindhi, Pushto, Baluchi	65	21.0	16.2	6.0	5.9	7.5	5.4	0.5	8.5
WOMEN 25–34 YEARS	474	100.0	16.4	4.2	4.6	4.0	3.0	1.6	34.8
Woman's education level									
≤3 years of schooling	391	82.5	16.0	4.2	4.7	3.9	3.0	1.7	36.2
≥4 years of schooling	83	17.5	17.9	4.1	4.9	4.4	3.2	1.7	34.7

Husband's occupation									
Unskilled	125	28.9	15.7	4.3	4.8	3.6	2.1	2.7	62.8
Clerical or skilled	172	39.7	16.4	4.4	4.9	4.0	3.2	1.7	34.7
Professional or managerial	136	31.4	16.7	4.3	4.5	4.1	3.7	0.8	17.8
Residence									
Nonmetropolitan	346	73.0	16.4	4.2	4.6	3.9	3.0	1.6	34.8
Metropolitan	128	27.0	16.1	4.4	4.9	4.1	3.1	1.8	36.7
Language									
Urdu	153	32.3	16.1	4.4	5.0	3.7	3.0	2.0	30.0
Punjabi	234	49.5	16.5	4.3	4.8	4.2	3.0	1.8	37.5
Sindhi, Pushto, Baluchi	86	18.2	16.3	3.7	3.9	3.9	2.9	1.0	25.6
WOMEN 15–19 YEARS	327	100.0	16.1	1.5	1.8	1.4	0.9	0.9	50.0
Woman's education level									
≤3 years of schooling	250	76.5	15.7	1.6	1.7	1.4	0.9	0.8	47.1
≥4 years of schooling	77	23.5	17.6	1.4	2.0	1.4	0.9	1.1	55.7
Husband's occupation									
Unskilled	88	29.7	15.5	1.5	1.5	1.8	1.1	0.4	26.7
Clerical or skilled	126	42.6	16.2	1.6	1.9	1.3	1.0	0.9	47.4
Professional or managerial	82	27.7	16.5	1.6	2.0	1.3	1.1	0.9	45.0
Residence									
Nonmetropolitan	257	78.6	16.1	1.5	1.8	1.5	0.8	1.0	55.6
Metropolitan	70	21.4	16.2	1.5	1.7	1.1	1.3	0.4	23.5
Language									
Urdu	101	31.2	15.8	1.6	1.9	1.2	0.8	0.9	59.7
Punjabi	134	41.3	16.9	1.6	1.9	1.5	1.1	0.8	42.1
Sindhi, Pushto, Baluchi	89	27.5	15.5	1.3	1.4	1.4	0.2	1.2	85.7

NOTE: 110 women either failed to report their husband's occupation or reported him to be a farmer. They are therefore not included in the analysis of husband's occupation as an independent variable.

a Percentage difference shown in col. 9 equals col. 8 divided by col. 5 X 100.

TABLE 6 Multiple classification analysis of number of live births, using age at marriage as a predictor and duration of marriage (A) and first pregnancy interval (B) as covariates, for three age groups of currently married women in urban Pakistan, 1968–69

Current age and age at marriage	Number (1)	Percentage (2)	Mean number of live births (grand or category mean) (3)	Unadjusted deviation from grand mean (4)	Deviation adjusted for: (A) (5)	(B) (6)	(A) + (B) (7)
Current age 35–44	313	103.0	6.62				
Age at marriage							
16 or less	227	75.5	6.90	.28	.09	.34	.15
17–18	47	15.0	6.66	.04	.21	–.11	.06
19 or more	39	12.5	4.92	–1.70	–.75	–1.87	–.93
Eta or beta				.22	.10	.24	.12
R^2				.048	.095	.105	.151
Current age 25–34	474	99.9	4.23				
Age at marriage							
16 or less	296	62.4	4.68	.45	–.10	.53	–.04
17–18	85	17.9	3.97	–.26	.04	–.33	–.02
19 or more	93	19.6	3.03	–1.20	.27	–1.40	.14
Eta or beta				.30	.07	.36	.03
R^2				.093	.276	.131	.353
Current age 15–24	327	100.0	1.53				
Age at marriage							
16 or less	201	61.5	1.76	.22	–.08	.21	–.07
17–18	70	21.4	1.40	–.13	.11	–.12	.11
19 or more	56	17.1	.91	–.62	.15	–.59	.11
Eta or beta				.22	.07	.21	.06
R^2				.050	.451	.052	.479

NOTE: Percentages may not sum to 100 because of rounding.

education, and whose husbands were in professional and managerial occupations, than among those who were classified in the same educational and occupational categories but had married at age 16 or earlier (Table 4). Table 7 presents the MCA results of five combinations of women's educational level and husband's occupation. Very few women with husbands in unskilled occupations had more than three years of schooling, so they were combined with those whose husbands were in clerical and skilled occupations. The five categories are treated as a rough scale of socioeconomic status (SES) from low to high. As expected, women with higher SES and in the oldest age group tended to have 1.5 (or 21 percent) fewer live births than those with the lowest SES, and 1.3 fewer than the average woman in that age group. With age at marriage held constant, however, the difference is reduced to 0.9 live births (or 13 percent). Exactly the same results (0.9 fewer live births) are obtained by controlling for duration of marriage. But a slight increase (to 1.6 fewer live births with higher SES) is noticed by taking into account first pregnancy interval.

The findings suggest that age at marriage and duration of marriage are both important factors in explaining fertility differentials among different socioeconomic groups. Seventeen percent of the variance is explained by the combination of the three demographic variables among the oldest group of women. There is a substantial increase in the explanation of variance (to 37 percent) for women aged 25–34 and 49 percent for those younger than 25 years. But the results for the younger women must still be interpreted with caution because they have not yet completed their families and their future fertility behavior is not known.

Table 4 provided some evidence of a lower cumulative fertility, to the magnitude of 0.9 live births, within the Sindhi, Pushto, and Baluchi language groups as compared with those speaking Urdu and Punjabi. Yet the latter groups reported much lower cumulative fertility among women who postponed marriage. This difference may be explained by whether current residence was in metropolitan or nonmetropolitan areas, as shown in Table 8. Because of the fairly small numbers of women of the Sindhi, Pushto, and Baluchi language groups residing in metropolitan areas, they are all treated here as nonmetropolitan. In any case, those residing in metropolitan areas would have recently moved there, for the two largest cities of Karachi and Lahore are largely inhabited by Urdu and Punjabi speaking populations.

That the highest cumulative fertility (7.8 births) was reported for Urdu speaking metropolitan women may be due to the fact that this group does not have the characteristics typical of a metropolitan population. Most of the women in this group married a generation ago, were new immigrants from central India having either rural or nonmetropolitan backgrounds, and came from traditionally large families (Driver, 1963). Moving to the city may have improved their living level but not affected their traditional fertility values, thus providing the condition for higher fertility. Moreover, with better medical facilities in the nation's capital[2] than in rural areas, the chances of pregnancy loss were smaller for this group of women. Finally, as mentioned earlier, women in the metropolitan areas tend to have fewer recall problems when reporting the total number of live births. On the other hand, fewer medical facilities have been available to the other groups, particularly to the Sindhi, Pushto, and Baluchi language groups, who might have had more incidents of pregnancy loss and thus may have reported fewer live births.

The substantial difference in cumulative fertility among ethnic and residential groups is largely reduced among women in the middle age group (24–34), the first four groups reporting almost the same cumulative fertility. In the youngest age group (15–24), the fertility pattern is opposite to that of the oldest group: Urdu speaking metropolitan women reported the *lowest* fertility. They were followed by the nonmetropolitan Sindhi, Pushto, and Baluchi speaking groups; and highest fertility was reported by the nonmetropolitan Urdu and metropolitan Punjabi speaking groups. This finding suggests that if the present trend continues, Urdu speaking women in the largest city (Karachi) will eventually have lower cumulative fertility than women of other ethnic groups and areas. The apparent fertility decline among Urdu speaking metropolitan women may be due to a combination of factors affecting female age at marriage as well as fertility, such as better educational facilities, a higher standard of living, a higher proportion of women in the nonagricultural labor force, the housing shortage, greater exposure to the mass media, and the concentration of family planning activities during more than two decades.

With an increase in female age at marriage, the enrollment in schools above the primary level, higher labor force participation in nonagricultural occupations, and a wider use of contraception, a decline in fertility among Pakistani women might be expected in the near future. This is indicated by the lower cumulative fertility of younger women, who married later, completed four or more years of schooling, and were living in metropolitan areas.

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[2] Karachi was Pakistan's capital until 1961.

SUMMARY AND CONCLUSIONS

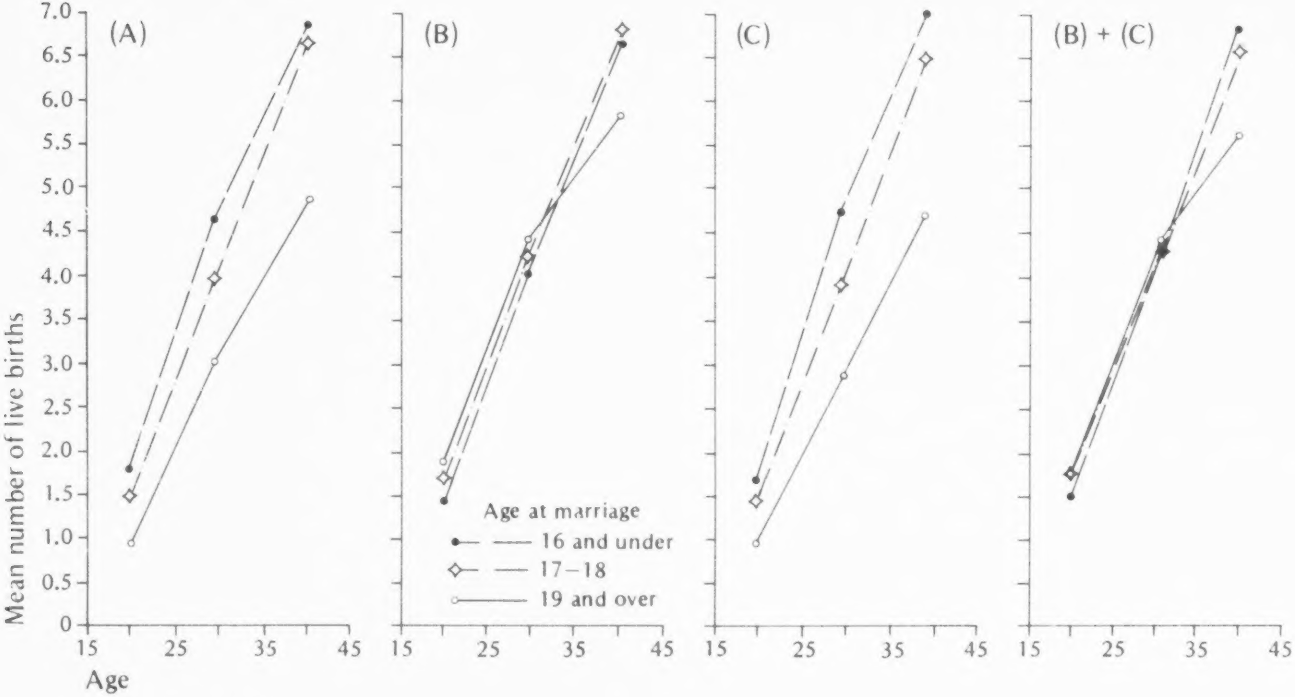
The well-established inverse relationship between age at marriage and cumulative fertility has been examined in this paper with data from the 1968–69 Pakistan National Impact Survey for currently married women 15–44 years of age who were living in urban areas. These women reported marrying at the very low mean age of 16 years, although among recently married women age at marriage was slightly higher (17.5). As a result of their lower age at marriage, women aged 35–44 at the time of the survey had a high cumulative fertility rate of 6.7 births. Twenty-nine percent lower cumulative fertility was reported by women who married at age 19 or later, compared with those married at age 16 or earlier. The latter group bore an average of 1.5 additional children, reported 1.9 additional pregnancies, and had a 1.7 higher total marital fertility rate. However, women who postponed marriage tended to reproduce faster, reporting a first pregnancy interval ten months shorter than that of women who married at earlier ages. Women with four or more years of schooling and husbands in professional and managerial occupations who married late had the lowest cumulative fertility. Cumulative fertility differentials among ethnic groups and between metropolitan and nonmetropolitan residents were also found among women who married at younger and older ages.

The MCA results indicate that duration of marriage and first pregnancy interval are important predictors in explaining the relationship between age at marriage and cumulative fertility. After taking into account duration of marriage, I found cumulative fertility to be 14 percent lower among women who postponed marriage compared with those who married at early ages. When the first pregnancy interval was controlled, the cumulative fertility was 32 percent lower for late marrying women. Socioeconomic status appears to have had a strong bearing on cumulative fertility; the relationship was also affected by age at marriage and duration of marriage. Older, Urdu speaking women living in metropolitan areas had the highest average cumulative fertility; but younger, Urdu speaking women living in metropolitan areas reported the lowest cumulative fertility of all ethnic groups. Age at marriage and duration of marriage were again important predictors of cumulative fertility for each of the categories of social and economic characteristics.

Though the data revealed an inverse relationship between cumulative fertility and age at marriage, it should be kept in mind that demographic variables are affected by social, economic, cultural, and other conditions, in Pakistan as elsewhere. These conditions have been changing rapidly in recent years as a result of socioeconomic development, particularly in urban areas. Because the findings reported here mainly apply to older women who were not affected by this rapid change during their reproductive years, more research is needed on the impact of these changes on younger age cohorts. Female age at marriage should be treated as an important aspect of population policy in Pakistan, where an integrated approach is needed to reduce high fertility. Increasing the legal female age at marriage from 16 to 19 years or more would have both social and demographic benefits. An average female age at marriage of 17 years is too low for a country in which marriage is universal.

The values supportive of lower age at marriage have deeply rooted social and economic bases. Girls are considered a liability, for they are not expected to be economically productive; therefore parents desire them to marry early. It seems apparent that not only must the legal age at marriage be increased, but also basic changes in women's roles must be introduced if a decline in fertility is to take place in Pakistan.

FIGURE 2 Mean number of live births by age at marriage, unadjusted (A) and adjusted for the effect of duration of marriage (B), first pregnancy interval (C), and combined effect of (B) and (C): currently married women aged 15–44 in urban Pakistan



SOURCE: Table 6.

TABLE 7 Multiple classification analysis of number of live births, using socioeconomic status as a predictor and age at marriage (A), duration of marriage (B), and first pregnancy interval (C) as covariates, for three age groups of currently married women in urban Pakistan, 1968–69

Current age, years of schooling, and husband's occupation	Number (1)	Percentage (2)	Mean number of live births (grand or category mean) (3)	Unadjusted deviation from grand mean (4)	Deviation adjusted for:			
					(A) (5)	(B) (6)	(C) (7)	(A)+(B)+(C) (8)
Current age 35–44	275	100.0	6.73					
⩽3, unskilled	77	28.0	6.93	.20	.15	.15	.24	.18
⩽3, clerical/skilled	84	30.6	6.84	.11	−.02	.03	.14	.01
⩽3, professional/managerial	76	27.6	6.75	.02	.03	−.02	.01	−.02
⩾4, unskilled/clerical/skilled	19	6.9	6.63	−.10	.13	.06	−.31	−.08
⩾4, professional/managerial	19	6.9	5.47	−1.26	−.76	−.74	−1.31	−.61
Eta or beta				.12	.07	.07	.13	.06
R^2				.014	.056	.086	.077	.167
Current age 25–34	433	100.0	4.33					
⩽3, unskilled	117	27.0	4.29	−.04	−.20	−.20	0	−.10
⩽3, clerical/skilled	141	32.6	4.25	.08	.04	.02	.10	.06
⩽3, professional/managerial	99	22.9	4.27	.06	.02	.03	.03	−.06
⩾4, unskilled/clerical/skilled	39	9.0	4.25	.08	.35	.26	.03	.16
⩾4, professional/managerial	37	8.5	3.92	−.41	.06	.17	−.49	.08
Eta or beta				.06	.07	.07	.07	.04
R^2				.004	.120	.284	.018	.365
Current age 15–24	296	100.0	1.59					
⩽3, unskilled	84	28.4	1.53	−.06	−.18	−.27	−.11	−.18
⩽3, clerical/skilled	96	32.4	1.54	−.05	−.08	−.05	−.04	−.07
⩽3, professional/managerial	52	17.6	1.75	.16	.11	.27	.17	.29
⩾4, unskilled/clerical/skilled	34	11.5	1.74	.15	.36	.22	.17	.13
⩾4, professional/managerial	30	10.1	1.47	−.12	.18	.22	−.07	.09
Eta or beta				.07	.12	.15	.08	.12
R^2				.005	.071	.460	.013	.492

TABLE 8 Multiple classification analysis of number of live births, using current residence and language as a predictor and age at marriage (A), duration of marriage (B), and first pregnancy interval (C) as covariates, for three age groups of currently married women in urban Pakistan, 1968–69

Current age, current residence, and language	Number (1)	Percentage (2)	Mean number of live births (grand or category mean) (3)	Unadjusted deviation from grand mean (4)	Deviation adjusted for:			
					(A) (5)	(B) (6)	(C) (7)	(A)+(B)+(C) (8)
Current age 35–44	310	100.0	6.65					
Nonmetropolitan, Urdu	57	18.4	6.23	–.42	–.49	–.58	–.29	–.45
Metropolitan, Urdu	41	13.2	7.83	1.18	1.15	.87	1.22	.94
Nonmetropolitan, Punjabi	112	36.1	6.91	.26	.23	.34	.24	.29
Metropolitan, Punjabi	35	11.3	6.35	–.30	–.19	–.15	–.42	–.25
Nonmetropolitan, Sindhi, Pushto, Baluchi	65	21.0	5.99	–.66	–.58	–.54	–.70	–.57
Eta or beta				.20	.19	.17	.20	.17
R^2				.039	.070	.114	.091	.172
Current age 25–34	473	100.0	4.72					
Nonmetropolitan, Urdu	92	19.5	4.41	.19	.11	.09	.21	.13
Metropolitan, Urdu	61	12.9	4.47	.25	.21	.01	.27	.02
Nonmetropolitan, Punjabi	177	37.4	4.23	.01	.09	.07	0	.05
Metropolitan, Punjabi	57	12.0	4.43	.21	.17	.25	.18	.16
Nonmetropolitan, Sindhi, Pushto, Baluchi	86	18.2	3.67	–.55	–.56	–.42	–.54	–.36
Eta or beta				.13	.13	.10	.13	.08
R^2				.017	.142	.284	.027	.360

TABLE 8 *(continued)*

Current age, current residence, and language	Number (1)	Percentage (2)	Mean number of live births (grand or category mean) (3)	Unadjusted deviation from grand mean (4)	Deviation adjusted for:			
					(A) (5)	(B) (6)	(C) (7)	(A)+(B)+(C) (8)
Current age 15–24	324	100.0	1.53					
Nonmetropolitan, Urdu	69	21.3	1.78	.25	.19	.02	.24	.03
Metropolitan, Urdu	32	9.9	1.31	−.22	−.32	−.29	−.20	−.31
Nonmetropolitan, Punjabi	102	31.5	1.51	−.02	.13	.11	−.01	.11
Metropolitan, Punjabi	32	9.9	1.78	.25	.39	.37	.29	.30
Nonmetropolitan, Sindhi, Pushto, Baluchi	89	27.4	1.34	−.19	−.32	−.17	−.20	−.15
Eta or beta				.13	.18	.13	.13	.12
R^2				.018	.098	.472	.027	.503

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PREFACE

An earlier draft of this paper was presented at the Workshop on Methodological Aspects of Demographic Analysis of Sterilization, held at the East-West Center in Honolulu during 17–21 September 1979 and sponsored jointly by the International Union for the Scientific Study of Population (IUSSP) Committee on Comparative Analysis of Fertility and the East-West Population Institute. Funds for the publication of this Paper were provided by the Office of Population, Agency for International Development.

ABSTRACT This paper compares the demographic impact of sterilization with that of other methods by means of a model that calculates births averted in discrete time intervals after contraceptive acceptance by cohorts of equal size accepting different methods. The method is distinguished by a discontinuation rate parameter, and the potential fertility imputed to contraceptors is age-specific natural fertility adjusted for acceptors' greater than average fecundity. Empirical data for applying the model are Louis Henry's average natural fertility schedule (based on 13 noncontracepting populations) and World Fertility Survey findings on proportion of women who think they are noncontraceptively sterile.

The findings suggest that because of a trade-off between duration of contraception and potential fertility, the differential in births averted between younger women using pills and IUDs and older couples resorting to sterilization is less than one might suppose. For example, women in their twenties using a method they discontinue at an annual rate of 40 percent avert within five years after acceptance as many as half the number of births as women aged 30–34 resorting to sterilization. The shorter the time interval from acceptance, the narrower is the differential.

Weighting the cohort (or per-acceptor) results by the relative numbers of couples in developing countries who might be interested in the various age-method mixes attenuates the advantages of sterilization for a decisive demographic impact. Although impressive proportions of older couples say they want no more children, the young age structure independently dampens the potential demographic impact of sterilization. Because of their superiority in numbers and fecundity, women under age 30 account for 70 percent of all births, and those under age 35 for 86 percent, according to an analysis of the maternal age distribution of births in 1975 in 33 developing countries with antinatalist policies.

A suggested strategy for maximizing the demographic impact of a family planning program is to emphasize sterilization initially, if feasible, in order "to skim the cream of the motivated" but not to wait too long before shifting the emphasis to renewable methods appropriate for birth spacers.

This paper focuses on sterilization as a contraceptive method for reducing fertility in countries concerned with high rates of population growth. Three factors determine the demographic impact of one segment of contraceptive use: the effectiveness of the method, the duration of uninterrupted use once adopted, and the potential fertility of the couple some nine months after the period of use. Quantification of these three factors permits calculation of total births averted by a couple. If potential fertility is equated with fertility expected in the absence of birth control, the number of births averted can be thought of as the *gross* demographic impact of the contraceptive method. If methods are seen as competing, with interest directed at the differential in births averted among methods, the increment in births averted by a more effective or more enduring method can be denoted as its *net* demographic impact. The analytic part of this paper deals with gross demographic impact, but the net impact of sterilization is also considered.

Sterilization obviously has unique virtues for contraceptive purposes, but to succumb to the temptation to infer that its virtues afford the possibility of achieving a rapid decline in fertility is to court overly ambitious demographic goals. Biological aspects of age-specific fecundity and empirical data on sterilization clientele suggest (1) that the demographic impact of voluntary sterilization is less than one might suppose, (2) that fertility norms have to be quite low before sterilization appeals to the appreciable number of couples required for a substantial demographic impact, and (3) that when fertility norms are low, sterilization is largely a substitute for other methods of contraception. China, with its apparent ability to apply community-level social pressure to fulfill national goals, is perhaps an exception to these remarks, but few countries have the political power and structure to radiate to the local level the influence necessary for such pressure.

Researchers are currently optimistic about the outlook for developing reversible contraceptive sterilization techniques, but the consensus is to regard current procedures as conferring permanent, irreversible sterility.[1] From a demographic perspective, it is the irreversibility of surgical contraceptive techniques that distinguishes sterilization from other methods of fertility control. A second distinguishing characteristic of demographic consequence is the effectiveness of sterilization in protecting against pregnancy, although other modern contraceptive methods—pills, intrauterine devices (IUDs), injectables, and even conventional barrier methods if properly used—are also highly effective in preventing conception (Tietze, 1970). These two attributes—effectiveness if performed, and duration for life once performed—are the salient factors for assessing the demographic impact of sterilization in comparison with other methods.

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[1] This view was often expressed and widely endorsed by participants at the Fourth International Conference on Voluntary Sterilization held in Seoul, Republic of Korea, 7–10 May 1979, under the sponsorship of the International Project of the Association for Voluntary Sterilization, headquartered in New York.

Sterilization prevalence

In some parts of the world contraceptive sterilization is becoming very popular among couples of reproductive age (CRA). Serious constraints to its adoption still exist, including traditional attitudes, lack of medical expertise and facilities in major parts of the world, legal and administrative restrictions, misconceptions about the nature of sterilization, and the anxiety that any operative procedure, no matter how minor, inevitably generates; but sterilization is now said to be the dominant method in use. Although the statistics on contraceptive use are generally weak, an expert on these matters recently reported that sterilization now accounts for one-third of all contraceptive practice in the world, whereas in 1970 the figure was 14 percent (Lubell, 1979). These proportions are tenuous in that they presuppose an estimated increase in China in sterilized CRA from 4 million in 1970 to 36 million in 1978. Also attenuating the global one-third proportion is the attribution of 70 million of the 90 million estimated sterilized CRA in the world in 1978 to three countries—China, 36 million; India, 22 million; and the United States, 12 million. These precautionary remarks are meant to forestall the notion that sterilization accounts uniformly for one-third of contraceptive practice around the world. Nevertheless, one should not lose sight of the impressive agreement among a variety of sources on the widespread surging interest in this method of birth control, its growing respectability, the improvement in female as well as male procedures that allow them to be performed on an outpatient basis, and the relaxation of legal restrictions (albeit sometimes accompanied by administrative rulings to guard against unwarranted sterilization).

Components of analysis of demographic impact

Given the irreversibility of contraceptive sterilization, resort to this method of fertility control is *prima facie* evidence of the couple's determination to have no more children. Couples who adopt this method do so in the belief they are still fertile, but few are likely to quantify the number or timing of the births they avert. Yet the quintessence of measuring the demographic impact of contraceptive practice, be it by sterilization or any other method, is quantification of the number of births a couple would have had in the absence of contraception. Moreover, for demographic purposes, it is not sufficient to know the number of births by which contraception reduces a couple's ultimate total fertility. Measurement of demographic impact requires apportionment of the averted births into time intervals of calendar or fiscal years, so that planners can assess the impact on fertility, the crude birth rate, age structure, and other demographic variables. If interest is further to measure net as well as total or gross demographic impact of a method (or a family planning program), then assessments are required of both the extent to which total births averted by the users of the method (or program) were incremental to those that would have been averted without the method (or program) and the extent to which availability of this method (or program) stimulated other method (or nonprogram) contraception.

Measurement of the demographic impact of contraception is thus a complex, technical exercise that is exacerbated by the speculative and controversial question of the potential fertility of a couple had no method or an inferior method been used. Sterilization has the advantage over other methods in that, given its effectiveness and duration, sterilized couples maximize their possible contribution to fertility decline. If individual couples maximize their demographic impact by contraceptive sterilization, is it not logical to leap to the conclusion that on a societal level, too, antinatalist policies can best be achieved by promoting sterilization?

This intuitive logic overlooks the relative number and age composition of the potential clients of voluntary sterilization compared with clients of reversible methods in societies with high fertility norms. The level of the parameters may differ but the array of factors governing voluntary acceptance of sterilization is the same in developing as in developed countries: a strong conviction that the couple has all the children it wants; a sense of assurance that the children will outlive their parents; sufficient understanding that the procedure does not interfere with sexual capacity or enjoyment; disaffection with hormonal, intrauterine, barrier, and traditional methods; easy access to, and the sophistication to take advantage of, trustworthy facilities and personnel for the operation; willingness to submit to a surgical procedure; and the expectation of very short-term inconvenience and minor, if any, side effects. Cost is an additional factor unless sterilization is free or subsidized. (For a comprehensive discussion of voluntary sterilization, see Green, 1978.) Although findings from the World Fertility Survey (WFS) and other surveys have long disclosed that high proportions of CRA say they want no more children, the interpretation that these data imply the existence of a vast potential market for sterilization fails to take into account this formidable vector of factors to be satisfied before a couple will consider submitting to voluntary sterilization (Brackett, 1979).

Age as a determinant of the demographic impact of contraception

Age is important in the measurement of contraception's demographic impact because it serves as the prime determinant of and a proxy for births averted. It is well known that female fertility characteristically increases from zero at age of menarche to a maximum sometime in the early or mid-twenties, then declines progressively with increasing age to virtually zero by age 50 (Coale and Trussell, 1974). Thus, after the age of peak fecundity, biology dictates that the older the contraceptive user, the lower is her potential fertility, and the fewer the births she will avert, even if she is presumed initially to be fecund.

Since number of children is highly correlated with age, contraceptive sterilization attracts people likely to be older than the average CRA and almost certainly older than couples interested in spacing rather than limiting births. Empirical data support the expectation that sterilized couples are older than couples who rely on other methods. The data assembled in Table 1 compare the wife's age at sterilization acceptance with that of acceptors of other methods in the family planning programs of several developing countries. It can be seen that women accepting sterilization (female or male methods) have about two more children and are at least five years older than women accepting pills or IUDs. It should occasion no surprise that in high-fertility societies, couples want to have at least four living children before they will consider limiting family size.[2]

For measuring demographic impact, the decisive age factor is not age at acceptance but rather age during contraceptive use, although of course the former influences the latter. In the case of renewable methods or methods that for one reason or another are discontinued at

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[2] In 1976 the Indian government headed by Indira Gandhi began employing coercive tactics to sterilize couples with two or three children in order to achieve a slower rate of population growth. That government was defeated in the 1977 elections, largely because of the unpopularity of those tactics, which the opposition party successfully exploited in the election campaign.

TABLE 1 Wife's age and number of living children at time of sterilization compared with acceptors of other methods in national family planning programs

Country and method	Acceptance period	Wife's age (median)	Number of living children
COLOMBIA			
Sterilization	1975	33.6	4.9
Orals	1975	24.7	2.2
IUDs	1975	26.1	2.5
HONG KONG			
Sterilization (female)	1977	33.9	3.2
Orals	1977	24.5	<1
INDIA			
Sterilization (male)	1976–77	33.2	3.8 (1975–76)
IUDs	1976–77	28.3	2.6 (1975–76)
INDONESIA			
Sterilization			
Male	10–12/1977	37.0	4.7
Female	10–12/1977	33.6	5.1
Orals	10–12/1977	26.0	2.4
IUDs	10–12/1977	26.5	2.5
MALAYSIA			
Sterilization	1977	32.8	5.0
Orals	1977	25.5	2.1
IUDs	1977	29.3	2.9
NEPAL			
Sterilization			
Male	1975–76	31.5	4.4
Female	1975–76	32.2	4.5
Orals	1975–76	30.3	3.4
IUDs	1975–76	28.7	3.2
PHILIPPINES			
Sterilization			
Male	1977	31.4	3.8
Female	1977	31.7	4.4
Orals	1977	26.7	2.5
IUDs	1977	27.0	2.6
THAILAND			
Sterilization			
Male	1977	34.0	3.4
Female	1977	29.5	3.5
Orals	1977	26.4	2.1
IUDs	1977	26.0	2.2

TABLE 1 *(continued)*

Country and method	Acceptance period	Wife's age (median)	Number of living children
TUNISIA			
Sterilization (female)	1975	36.4	5.4
Orals	1975	28.8	3.3
IUDs	1975	29.2	3.6

SOURCE: Nortman and Hofstatter (1978, 1979).

high rates, the average age of current users (let it be called prevalence age) is not likely to differ very much from that of current acceptors (incidence age). This is not so for a permanent, irreversible method. As successive cohorts of sterilization acceptors accumulate and age over time, even if cohort size increases and acceptance age decreases, as long as fertility norms are still fairly high, the prevalence age is likely to exceed the incidence age. In India, for example, women are, on average, age 33 when their husbands undergo vasectomy; but by 1977 wives among sterilized CRA averaged about age 38 because of the aging of earlier cohorts of sterilization acceptors who were still of reproductive age (Dandekar, 1977).

It is of interest that even in low-fertility societies, where sterilization is popular among younger as well as older couples, the age differential between sterilized couples and users of other methods is appreciable. In the United States, for example, in 1973 when sterilization already accounted for almost one-fourth of all contraceptive use, the average age of the wife among sterilized couples was 35.4 years compared with 26.8 years among women taking pills and 29.9 years among women using IUDs and diaphragms.[3]

Births averted: a trade-off between method duration and potential fertility

Births averted by contraception are generally calculated as the product of potential fertility and duration of contraceptive use. (Use duration can be adjusted for overlap with pregnancy, with postpartum infertility, etc., but such refinements will not significantly affect the ensuing discussion.) It therefore follows from the above observations on the age of sterilized couples that the impact of sterilization on a developing country's birth rate is a trade-off between method effectiveness and duration of its use on the one hand, and relatively low potential fertility on the other hand.

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[3] Computed from Ford (1978).

One way to compare sterilization with other methods is to ascertain the higher potential fertility required of users of other methods to compensate for higher discontinuation rates in order to avert the same number of births. The result is a function not only of the discontinuation rate specified but also of the time interval selected for calculating the averted births. Within a fairly short time interval after acceptance, sterilization will not yet have had time to manifest its advantage over other methods. On the other hand, too long a time period is not warranted because couples adopting reversible methods do not forever renounce contraception upon terminating a particular segment of use. On the contrary, method resumption and switching are common among ever-users of contraception after fairly short periods of nonuse, or after lactation if a birth has occurred.

To illustrate this point, let us examine the relation between the duration of use provided by different discontinuation rates and corresponding potential fertility to avert a fixed number of births during months 13 through 24, or the second year, following acceptance. (This is an appropriate interval to consider because, on the plausible assumption that acceptors are not pregnant at acceptance, the nine-month gestation period and the possible overlap of initial use with postpartum infertility as well as with waiting time to conception mean that few births are likely to be averted during the first year following acceptance.) Taken as the standard, sterilization acceptors are assigned a relative potential fertility of 1.00 in the twelve-month period of averted births under review. Instead of permanent continuation, however, a 2 percent annual rate of discontinuation is somewhat arbitrarily imputed to them to allow for marital dissolution; likewise, the proportion of the sterilized cohort for whom the method takes effect is assumed to be .98 rather than unity to allow for improperly performed surgery and failure of the couple to follow medical instruction regarding waiting time before resuming intercourse.

Other methods are distinguished not by name but by specific discontinuation rates. Given these rates, it is simple to calculate the proportion of the period from months 4 through 15 (nine months earlier than the births-averted period) that is protected from pregnancy risk by contraceptive use. With the number of births averted equal to the product of potential fertility and contraception nine months earlier, the relative potential fertility of equal-size cohorts adopting different methods (i.e., different discontinuation rates) to avert the same number of births in year 2 after acceptance follows readily. Table 2 presents the results; its notes explain the methodology in mathematical terms. It can be seen that the potential fertility of acceptors of methods discontinued at annual rates of 10, 15, 20, 25, 30, and 40 percent must exceed that of sterilization acceptors by 9, 14, 18, 29, 34, and 52 percent respectively in order to yield the same demographic impact as sterilized couples do in the second year following contraceptive adoption.

TABLE 2 Relative potential fertility of a contraceptive acceptor cohort that will avert an equal number of births in year 2 following acceptance of contraceptive methods discontinued at different rates

Continuation schedule[a]					
Proportion starting use (1)	Annual discontinuation rate (2)	Mean duration of use (years) (3)	Use over period that averts births in year 2[b] (4)	Index of births averted[c] (5)	Relative potential fertility[c] (6)
.98	.02	49.0	.965	.965	1.00
.95	.10	9.5	.882	.965	1.09
.95	.15	6.3	.850	.965	1.14
.95	.20	4.75	.819	.965	1.18
.90	.25	3.6	.748	.965	1.29
.90	.30	3.0	.721	.965	1.34
.85	.40	2.1	.634	.965	1.52

NOTE: Implicit in the calculation is the assumption that conception during contraceptive use results in immediate discontinuation of the method, so that all use is effective and there is no overlap of pregnancy and use. This limitation is not considered to affect the results appreciably.

[a] The continuation schedule is assumed to conform to the modified decay curve, $C = ae^{-rt}$, where C is the proportion of an initial acceptor cohort remaining at time t, r equals the proportion discontinuing per unit of time, a equals the proportion remaining after an immediate dropout of $1 - a$, and e is the natural logarithm constant 2.718 . . . . The mean duration of use = a/r.

[b] If t_0 represents acceptance time, (t measured in years), then use (U) in the interval $t_{.25} \leqslant U \leqslant t_{1.25}$ averts births in months 13 through 24 after acceptance, with a nine-month allowance for gestation. U is readily calculated from

$$U = \int_{.25}^{1.25} ae^{-rt}\, dt = (a/r)\ (\exp[-.25r] - \exp[-1.25r]).$$

[c] The number of births averted is the product of use and potential fertility. With a potential fertility rate of 1.00 assigned to sterilization, its continuation schedule averts .965 births. Dividing column 5 by column 4 yields column 6, the relative potential fertility required to achieve the same number of averted births as sterilization.

Differentials in age-specific fertility rates

As orders of magnitude, let me suggest that IUDs and orals accepted in the first segment are discontinued at annual rates of 25 and 40 percent respectively.[4] A preliminary inquiry can now consider, on the basis of differentials in age-specific fertility rates (ASFRs), which strategy is likely to have the greater short-term (next-year) demographic payoff: one designed to attract younger women to IUDs and pills or one that offers sterilization to couples wanting no more children.

In an analysis of ASFRs among 13 populations not practicing birth control, Henry (1961:85) found the average rates presented in Table 3.

TABLE 3 Average age-specific female marital fertility among 13 noncontracepting populations

Age group	Rate per 1,000	Index Ages 30–34 = 100	 Ages 35–39 = 100
20–24	435	117	146
25–29	407	110	136
30–34	371	100	124
35–39	298	80	100
40–44	152	41	51

SOURCE: Henry (1961:85).

Let us assume for the moment that acceptors have a potential fertility typical of their age group. Then the data in Table 3 suggest that women aged 20–24 using modern renewable methods would avert at least as many births in the short run as women aged 35–39 taking sterilization. This also applies to women aged 25–29 or 30–34 taking IUDs. On the other hand, compared with women sterilized at ages 30–34, women aged 20–24 would have to limit discontinuation to less than 20 percent per year, and women aged 25–29 to less than 11 percent per year, to achieve the same demographic impact in year 2 after acceptance.

The above analysis is inadequate in several respects. First, it fails to take into account the empirical knowledge that acceptors are more fecund than their noncontracepting age counterparts, a factor that narrows the age differentials in the potential fertility of acceptors. Second, cumulating averted births over annual intervals up to, say five, instead of two, years after acceptance may be of interest, with a caveat in interpreting such findings not to ignore that discontinuers of renewable methods are often repeat acceptors over a five-year period. Finally, the analysis thus far has been limited to births averted on a cohort or per acceptor basis. Yet to be considered (but deferred to a later section) is the age distribution of couples of reproductive age, which prompts different, not equal, numbers of couples to adopt different methods.

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[4] These rates are generally of poor statistical quality. The follow-up surveys necessary to establish the empirical data are both expensive and difficult, and hence infrequently undertaken. Moreover, discontinuation rates have been found to vary widely over time and space, and by acceptor age, making generalizations crude averages.

Births averted by cohorts of equal size accepting various contraceptive methods

Henry (1961) has noted that because of cultural differences, fertility differentials are great even among populations practicing very little contraception. Hence, estimates of births averted by contraception based on any one set of fertility rates, hypothetical or otherwise, could be wide of the mark if applied to a particular population. For a reasonable generalization of the gross demographic impact of different methods of contraception, I postulate average age-specific female marital fertility rates from Henry's 13 countries. To reflect the potential fertility of contraceptive users, however, these rates require adjustment to take account of the contraceptors' higher than average fecundity.

Although more fecund than average, acceptors are likely to include some sterile couples. I obtained a quantitative estimate of the extent to which sterile couples might enroll in a contraceptive program, doing this by averaging the World Fertility Survey findings for 11 countries on the age-specific proportions of married women who considered themselves sterile for noncontraceptive reasons. (As expected, these proportions are less than Henry's estimate of natural secondary sterility.) Adjustment of the Henry rates by dividing them by the proportion of the age group that considers itself fecund (the complement of the WFS proportion sterile) yielded a plausible potential fertility schedule to assign to contraceptive acceptors. To take account of the aging of acceptors with the passage of time, I assumed their potential fertility (based on age at acceptance) to wane over time at the same rate of decline as in the Henry fertility schedule. The data and the process are given in the Appendix Table.

As before, I computed births averted in specified years after acceptance as the product of potential fertility and the proportion of the time interval nine months earlier protected by contraception from the risk of pregnancy. (For the mathematics of the continuation of contraceptive use schedule, see the notes to Table 2.)

The methodology described above yielded the following cumulative number of births averted over time, up to 60 months from acceptance, among 1,000 couples adopting sterilization but subject to a 2 percent per annum attrition rate (to allow for marital dissolution):

Time lapse from sterilization	Wife's age at sterilization	
	30–34	35–39
24 months	358	292
36 months	694	547
48 months	1,010	766
60 months	1,306	951

It is not appropriate to add the two age-group columns for an estimate of total births averted in a ten-year period by women aged 30–34 at time of sterilization. The reason is that the older age group has a higher proportion fecund at acceptance than the younger age group would have had at ages 35–39 in the absence of contraceptive sterilization at ages 30–34.

Births averted by young women using methods other than sterilization, that is, methods with higher discontinuation rates, are shown in Table 4 and in Figures 1 and 2, not in absolute numbers but by means of an index equal to 100 of the above data on the births averted by women in their thirties adopting sterilization.

Would one have guessed that a cohort of women starting contraception in their twenties but discontinuing the practice at the rate of 40 percent per year, without any resumption of such practice by the discontinuers, would avert as many as half the births in a five-year period as women who are sterilized in their early thirties? Or that they would avert about two-thirds the number of births averted by sterilized women if the discontinuation rate among younger women declined to 25 percent? Compared with births averted by women sterilized in their late thirties, the births younger women avert, even by methods with characteristically high attrition rates, are indeed impressive. With a discontinuation rate of under 25 percent, women starting a method at ages 20–24 will avert more births over a five-year period than women sterilized at ages 35–39. Even at ages 25–29, renewable methods achieve a favorable demographic impact compared with sterilization among older couples. Moreover, it should be stressed again, the data in Table 4 relate to first-segment use only of an accepted method;

TABLE 4 Index of cumulative births averted at specified time periods from acceptance of contraceptive methods discontinued at different annual rates

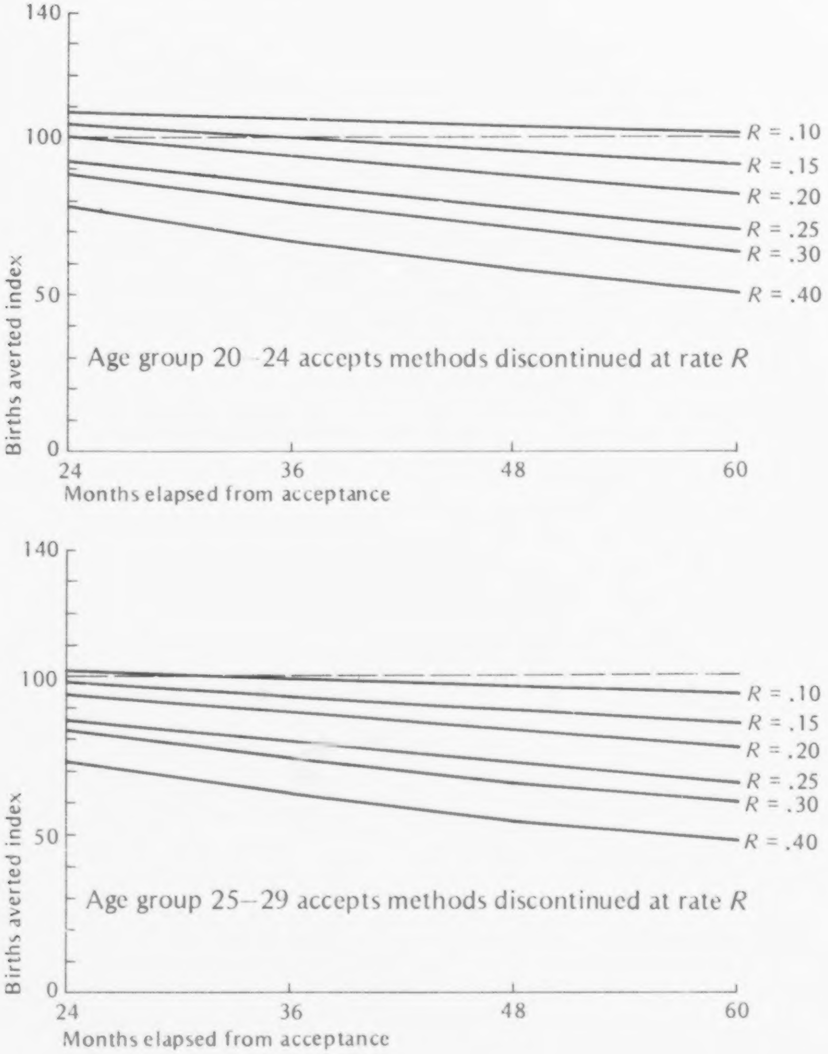
(Index based on births averted by sterilization acceptors = 100)

Acceptor age and method[a]		Months from acceptance			
		24	36	48	60
INDEX BASE: AGE GROUP 30–34					
Age 20–24					
Method					
a	*r*				
.95	.10	108	105	103	101
.95	.15	104	99	95	91
.95	.20	100	94	87	82
.90	.25	92	84	77	71
.90	.30	88	79	71	64
.85	.40	78	67	58	51
Age 25–29					
Method					
a	*r*				
.95	.10	102	99	96	94
.95	.15	98	93	89	85
.95	.20	94	88	82	77
.90	.25	86	79	72	66
.90	.30	83	74	66	60
.85	.40	73	63	54	48
INDEX BASE: AGE GROUP 35–39					
Age 20–24					
Method					
a	*r*				
.95	.10	132	134	136	138
.95	.15	127	126	125	125
.95	.20	123	119	115	113
.90	.25	112	106	101	97
.90	.30	108	100	93	88
.85	.40	95	84	76	70
Age 25–29					
Method					
a	*r*				
.95	.10	125	126	127	129
.95	.15	120	118	117	117
.95	.20	116	112	108	105
.90	.25	106	100	95	91
.90	.30	102	94	88	83
.85	.40	90	79	71	65

[a] Method is defined by the parameters a and r in a continuation schedule conforming to the modified decay curve, $c = a\exp(-rt)$. For an explanation of these parameters and the methodology for calculating births averted, see the notes to Table 2.

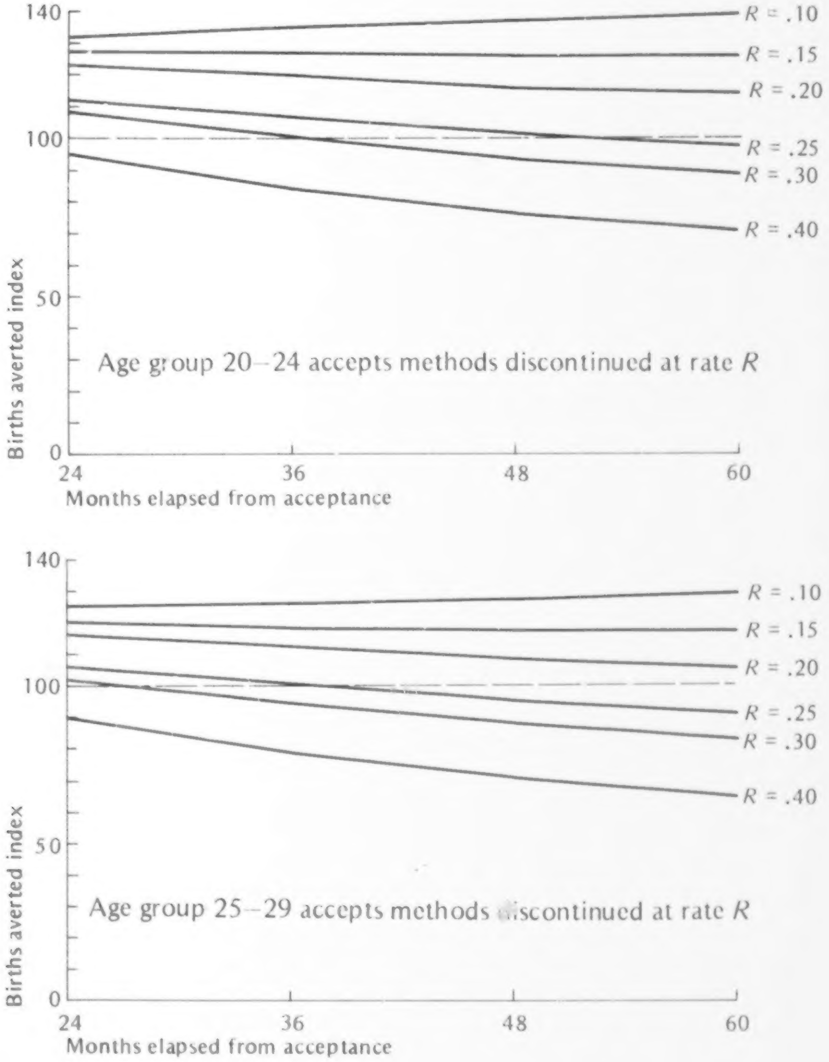
FIGURE 1 Index of cumulative births averted over time by a contraceptive acceptor cohort discontinuing adopted method at rate *R* per year

(Index base: births averted by sterilization acceptors aged 30–34 = 100)



SOURCE: Table 4.

FIGURE 2 Index of cumulative births averted over time by a contraceptive acceptor cohort discontinuing adopted method at rate *R* per year
('ndex base: births averted by sterilization acceptors aged 35–39 = 100)



SOURCE: Table 4.

they exclude the possibility of resumption of contraception among the discontinuers and therefore of additional births that might be averted within the period under review.

Also of interest is the time trend of the demographic impact of first-segment use of renewable methods versus sterilization, evident in Figures 1 and 2. As expected, with an increase in time, the demographic impact of discontinuable methods adopted by younger women diminishes relative to that of sterilization among older couples, yielding downward (negative) sloping lines. (An exception is the 10 percent discontinuation rate shown for the sterilization base age group 35–39 (Figure 2), which has an upward (positive) slope; but a 10 percent annual discontinuation rate is rarely encountered for first-segment acceptance.) Also to be noted is the increase in the negative slope as the discontinuation rate increases, although the departure from equally negative slopes appears slight. That is, the lines appear quite parallel and the four time points for each method are a very good fit to a straight line (constant slope).

On the whole, it is striking how closely younger women practicing contraception for relatively short periods of time approximate the births averted by women who resort to sterilization sometime in their thirties. The explanation for this finding is quite simple. It lies in the biological finding that younger women are more fecund than older women and that their fecundity wanes less rapidly over time. Hence, the possibility exists in the trade-off between fecundity and contraceptive use over a not too long time period for younger women to approximate with renewable methods the demographic impact of older women rendered permanently infertile by voluntary sterilization.

Age composition of women of reproductive age

The analysis thus far of births averted by several mixes of age and method has been on a per acceptor or cohort basis. While of theoretical interest, for this analysis to be meaningful in the real world, the cohort findings have to be weighted by the relative number of couples likely to adopt the different age-method mixes. It is primarily this weighting aspect that attenuates the advantages of sterilization for a decisive demographic impact.

These weights derive not only from the proportion of couples who want no more children but also, perhaps more importantly, from the age composition of women of reproductive age (WRA), because different methods are appropriate for different age groups. The developing countries have a young age structure, a heritage of high fertility coupled with recent mortality declines. Thus WRA tend to be heavily weighted with younger women not likely to be interested in sterilization. The rise in the age at marriage associated with modernization produces an age structure among married WRA less adverse for fertility decline than among total WRA, but average age at first marriage has to be quite high for the two age distributions to differ appreciably.

Data on married women by age in developing countries are not very reliable, and with shifting marriage patterns are likely to be out of date. For whatever it is worth, just to indicate the relative orders of magnitude in the different age groups, the age distribution of married WRA in several developing countries is presented in Table 5 as an index number based on age group 30–34 = 100.

Among the 11 countries shown in Table 5, the Republic of Korea is outstanding in having more married women in their thirties than in their twenties, and very few married women under age 20. In view of this age structure among married CRA in Korea, it is good strategy to promote sterilization, as Korea is now doing in its national family planning program. In five other countries–Malaysia, the Philippines, Taiwan, Thailand, and Tunisia–the number of married women in their twenties appears about equal to the number in their thirties. In these countries, too, a potential market may exist for sterilization worthy of consideration for a demographic impact. In the other countries, as in-

TABLE 5 Index of married women in specified age groups: age 30–34 = 100

Country and year	15–19	20–24	25–29	30–34	35–39	40–44
Colombia, 1973	37	105	114	100	97	76
Costa Rica, 1973	42	108	113	100	94	78
India, 1971	74	114	116	100	85	66
Indonesia, 1971	50	88	116	100	92	62
Korea (Republic), 1976	4	51	95	100	84	64
Malaysia, 1970	31	86	95	100	80	66
Mexico, 1975	44	105	114	100	84	69
Philippines, 1970	25	87	107	100	92	71
Taiwan, 1975	14	89	107	100	97	85
Thailand, 1970	36	85	98	100	90	70
Tunisia, 1975	16	98	115	100	113	102

SOURCES: Unless otherwise noted, computed from United Nations (1977, table 41). Korea: Republic of Korea (1977, table 17). Taiwan: Republic of China (1976, table 10). Tunisia: correspondence from C. Tarifa, director, Institut National de la Statistique.

deed in most developing countries, the predominance of young women among CRA suggests that birth spacers as well as birth limiters are necessary for a decisive demographic impact.

Age composition of mothers

A final consideration regarding the potential supply of clients for sterilization versus other contraceptive methods is the age composition of women giving birth each year. An analysis of the maternal age distribution of births in 1975 in 33 developing countries that have official policies to reduce population growth rates showed that on average (median) women aged 30 and over accounted for 30 percent of all births, while women aged 35 and over produced 14 percent of all births.[5] Since these are appreciable proportions, the elimination of fertility after age 30, or even after 35, would have a decisive demographic impact. However, to pin hopes on zero fertility after age 30 or 35 is obviously unrealistic.

In the course of the demographic transition, fertility declines faster at older ages; and sterilization, especially with the recent improvement in techniques, is an attractive method that can make a significant contribution. Nevertheless, to judge by the average current age of women among sterilized couples, to emphasize this method unduly in trying to achieve demographic targets in developing countries is to give secondary consideration to the couples who produce some 80 to 85 percent of the births.

Implications for family planning program strategy

On the basis of the experience of developed countries, it can be argued that whatever the *gross* demographic impact of sterilization, its *net* contribution is small. The empirical evidence for this view is the achievement of low birth rates in the presently developed countries long before contraceptive sterilization became available or popular. The argument also rests in the reasonable proposition that couples sufficiently motivated to resort to sterilization would find other effective means of controlling fertility if they could not be sterilized. By this line of reasoning, sterilization is largely a substitute for other methods, having an inherently wide differential between its *gross* and its *net* demographic impact.

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[5] Computed from data in the Population Council data bank by applying the average of age-specific fertility rates in 1970–75 and 1975–80 to the female population age structure in 1975. For a list of the 33 countries, see Nortman and Hofstatter (1979, table 6).

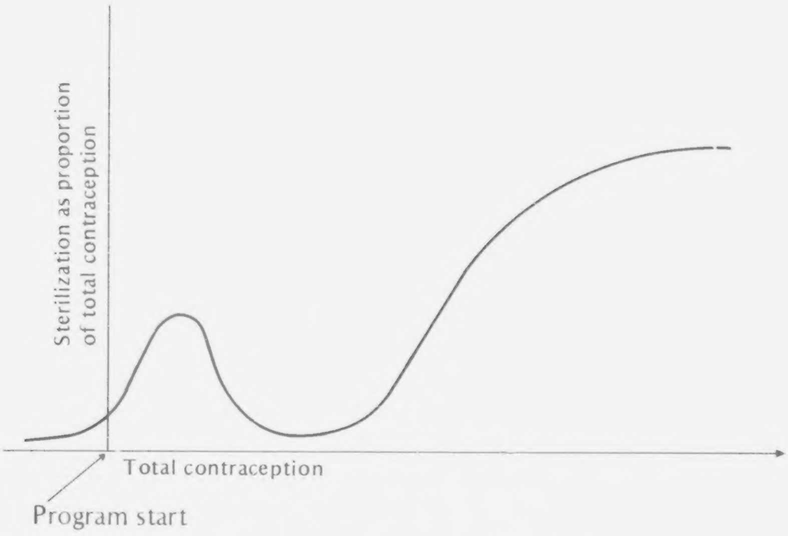
Sound as the above reasoning is, the demographic impact of sterilization in developing countries is constrained more by the limited clientele interested in this method than by the differential between the gross and net effects. As long as fertility norms remain high, couples of reproductive age ready to accept sterilization are likely to continue to be relatively few in number and several years older than the average CRA, yielding a smaller than desired demographic impact, whether measured in gross or net terms.

The recent advances in sterilization techniques, especially for women, are gratifying and doubtlessly are stimulating family planning program administrators to promote this method of fertility control. At the same time, choice of methods is dictated not by clinical or demographic efficiency but by the culture and level of development of the society. Methods are inappropriate if the required medical infrastructure is lacking, or the housing facilities and literacy level necessary for their use are inadequate, or they are in some way repugnant to the religious or esthetic sensitivities of the population.

In recognition of the cultural and economic situations of their countries, governments emphasize different methods in their national family planning programs. All profess to offer a wide variety to give couples freedom of choice, but in reality one or two methods predominate in the offerings. Some countries have promoted sterilization at an early stage of their program as a strategy designed "to skim the cream of the motivated" and maximize the demographic impact. Others have gone the route from the IUD to pills or introduced both simultaneously. Disillusion with IUDs and pills, as well as with failure to reach the large rural masses of the population, are encouraging governments to rely on community-based distribution of conventional methods and to place less reliance on medical personnel and facilities.

In developed countries sterilization is increasing as a proportion of total contraceptive practice. In developing countries premature stress on sterilization—that is, while fertility norms are still high—is likely to be counterproductive. A suggested strategy to maximize demographic impact is presented in Figure 3, which shows the relation between sterilization as a proportion of total contraceptive use and the overall level of contraception. The strategy calls for offering sterilization, if feasible, at the start of a program when the overall contraceptive use level is low; to introduce and emphasize spacing and renewable methods once the "cream of the motivated has been skimmed" by sterilization; and finally, when fertility norms have fallen and contraceptive practice is endemic, again to encourage or allow sterilization to replace other methods.

FIGURE 3 Strategy on sterilization as a component of total contraception to maximize demographic impact



APPENDIX TABLE Derivation of potential fertility of contraceptive acceptors

Acceptor age group	Henry fertility rates[a]	WFS findings on percentage naturally sterile[b]	Potential fertility of acceptors in specified year from acceptance time[c]					
			Year 1[d]	Year 2	Year 3	Year 4	Year 5	Year 6
20–24	435	2	444	438.2	432.4	426.6	420.8	415.0
25–29	407	3	420	412.6	405.1	397.7	390.2	382.8
30–34	371	4	386	370.8	355.6	340.4	325.2	310.0
35–39	298	11	335	302.2	269.4	236.5	203.7	170.9
40–44	152	25	203	162.4	121.8	81.2	40.6	0

[a] Source: Henry (1961:85).

[b] An average of the proportions among currently married women who think themselves sterile for noncontraceptive reasons in the published reports for Bangladesh, Colombia, Dominican Republic, Indonesia, Korea (Republic), Malaysia, Nepal, Pakistan, Panama, Sri Lanka, and Thailand. Among those sterilized for contraceptive reasons a few would have become sterile in any case, and this factor would inflate slightly the proportions in the table. Ignoring this factor does not significantly affect the results, however.

[c] The rates for year 6 are regressed from the year 1 rates in the same proportion as the decline in the average (Henry) rates. Rates for the in-between years are linear interpolations of the rates in years 1 and 6. Zero fertility is assumed at age 45.

[d] Since acceptors can be assumed to be nonpregnant at acceptance, very few births are expected in year 1 because of the waiting time to conception and the nine-month gestation in the absence of contraception. The year 1 rates are the point of departure for calculating the potential fertility of contraceptive acceptors over time.

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Prevalence and demographic significance of contraceptive sterilization in Fiji, the Republic of Korea, and Sri Lanka

Charles F. Westoff,
Noreen Goldman,
and Minja Kim Choe

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Noreen Goldman,
and Minja Kim Choe

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PAPERS OF THE EAST-WEST POPULATION INSTITUTE

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PREFACE

A summary of this Paper was presented at the Workshop on Methodological Aspects of Demographic Analysis of Sterilization, sponsored jointly by the International Union for the Scientific Study of Population (IUSSP) Committee on Comparative Analysis of Fertility and the East-West Population Institute, and held at the East-West Center in September 1979. The authors wish to acknowledge the contribution of the following persons from the East-West Population Institute: Ruby Bussen for programming assistance, Gregory Chu for graphics, and Siew-Ean Khoo for the section on "Availability of Sterilization." Funds for the preparation of this Paper were provided by the Office of Population, Agency for International Development.

ABSTRACT This paper presents estimates of the probability of being contraceptively sterilized and of births averted by sterilization based on World Fertility Survey data for Fiji, the Republic of Korea, and Sri Lanka. The estimates are for the early history of sterilization during the first half of the 1970s. Sterilization diffused earlier in Fiji, later in Sri Lanka, and even later in Korea, although it has since spread very rapidly in Korea. In this early period, the probability of becoming sterilized by 30 years of marriage was 0.54 in Fiji, 0.38 in Sri Lanka, and 0.17 in Korea. Couples electing sterilization had higher past fertility than other couples. They also tended to live more in urban areas and never to have used contraceptive methods. About two thirds of the operations occurred when the wife was 25–34 years of age. On the assumption that sterilized couples, if they had not been sterilized, would have had the same fertility as other couples of the same marriage duration, births averted by sterilization are estimated to be 0.8 for Fiji, 0.3 for Korea, and 0.7 for Sri Lanka.

In view of rapidly increasing rates of contraceptive sterilization throughout the world, Westoff et al. (1979) recently developed a standard set of procedures for the analysis of its prevalence and demographic significance for application to data collected in the World Fertility Survey (WFS). Their model was developed with data from Panama, a country having particularly high rates of sterilization. The present report is an application of some of the model procedures to three additional countries–Fiji, the Republic of Korea, and Sri Lanka. These three countries have lower but nevertheless substantial sterilization rates, rates that have undoubtedly increased since the WFS was undertaken. Sterilization rates are demonstrably higher in Korea now than at the time of the WFS in 1974,[1] and they have presumably also increased in Fiji since 1974 and in Sri Lanka since 1975. The substantive interest in this analysis lies in tracing the growth and demographic implications of contraceptive sterilization in the early years of its history.

---

[1] According to Koh et al. (1979), the number of sterilizations performed in the government program increased from 37,368 in 1974 to (an estimated) 230,320 in 1978.

AVAILABILITY OF STERILIZATION

There are no legal sanctions against sterilization in Fiji, Korea, or Sri Lanka. Both male and female sterilization procedures are offered in the national family planning programs of the three countries. Because sterilization is a surgical procedure and can be performed only by trained physicians in a suitable medical setting, however, it is unlikely to be available uniformly in all regions of the countries.

Male and female sterilization is offered by the medical department of Fiji and its family planning program. That it has become the most commonly used method among currently married women who want no more births attests to its wide availability in that country. The Fiji Fertility Survey has found that regional, rural-urban differentials in the prevalence of sterilization are minor for the Indian population. But the prevalence among Fijians in the rural areas and the northern region is lower, and it has been suggested in the report on the Fiji Fertility Survey of 1974 that "perhaps the relatively greater geographical isolation of the Fijian compared to the Indian community with consequently reduced access to hospital facilities partially accounts for these variations" (Fiji, Bureau of Statistics, 1976:92). Unfortunately, the Fiji Fertility Survey produced no data with which we can test this hypothesis.

Vasectomy has been available as a program method in Korea since 1962, when the family planning program was initiated. Female sterilization was first offered in the program in 1972, and since 1976 the program has given special emphasis to sterilization as a means of contraception. Private physicians who have undergone training by the program are authorized to perform the sterilization procedures. Physicians' fees are subsidized by the program, and since 1976 sterilization has been available at no cost to the acceptor who goes to a program-designated physician. As of mid-1978, 1,060 doctors were authorized to provide vasectomy services, 472 trained to perform laparoscopy, and 526 trained in the minilap technique (Hong, 1979). Currently about half of the authorized physicians are stationed in the cities, and the remaining work in rural areas, where the majority of Koreans live. Sterilization is therefore less accessible to the rural population and this imbalance is reflected in the urban-rural prevalence differential (shown in Table 1). The introduction of 95 new laparoscopes into the rural areas in 1979 should increase the availability of female sterilization in those areas (Koh et al., 1979).

In Sri Lanka, sterilization is also more accessible to the urban than to the rural population because the procedure is performed in government hospitals or by private physicians in nursing homes, most of which are in the urban areas. The operation is available free through the family planning program, but the consent of the acceptor and the acceptor's spouse is required and acceptors must have a minimum of three living children.

DATA AND DEFINITIONS USED IN ANALYSIS

Information on sterilization was obtained in the WFS interviews either from responses to questions on contraceptive methods currently being used, or in response to a question asked of women who could not have a (another) child as to whether they or their husbands had had an operation at least in part to prevent additional childbearing (Fiji, Bureau of Statistics, 1976; Korea, National Bureau of Statistics and Korean Institute for Family Planning, 1977; Sri Lanka, Department of Census and Statistics, 1978). A couple's motive to elect sterilization may be exclusively contraceptive or it may involve medical considerations as well. For our analysis, we have included operations reported to have been motivated only in part by contraceptive considerations as well as operations reported to be solely contraceptive in intent. Since contraceptive sterilization accounts for the overwhelming majority of all surgical sterilization cases,[2] there would be only slight increases in prevalence rates, concentrated primarily at the older ages, had we analyzed all sterilizing surgery. Noncontraceptive operations occur primarily at older ages, and therefore their inclusion would have had little significance for births averted.

The prevalence of male sterilization varies considerably across the three countries. In Korea two-thirds of the contraceptively sterilized were male as of 1974–though this proportion has declined dramatically in more recent years; in Sri Lanka only 6 percent were male; and in Fiji less than 1 percent were male. Our analysis covers both male and female operations in the measurement of sterilization rates, although it focuses on the demographic characteristics of female acceptors.

We employ two definitions of the population at risk. Most calculations are based on the total samples of ever married women; accordingly, the temporal dimension of risk is represented by years since first marriage. Another denominator, "currently married, fecund women who want no more births," is used for some purposes because it approximates more closely the concept of a population at risk for contraceptive sterilization. The denominator of "all ever married women" is the more interesting for overall demographic purposes, whereas that of "currently married, fecund women who want no more births" is the more refined for the analysis of correlates of sterilization.

---

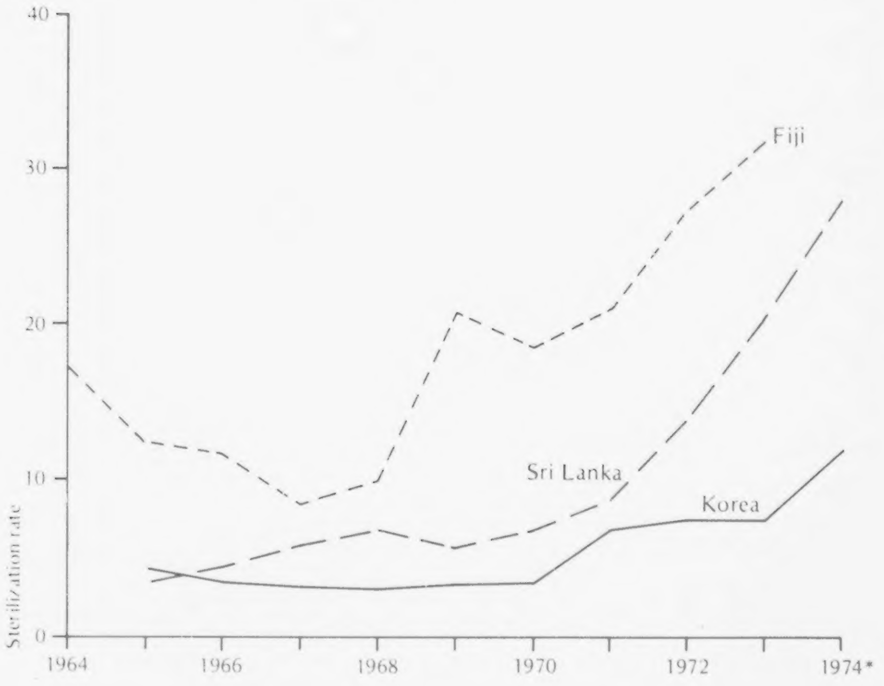
[2] Contraceptive operations comprised 86 percent of all sterilizations in Korea and 95 percent in Sri Lanka. The prevalence of noncontraceptive sterilizing surgery could not be determined for Fiji.

FINDINGS

Prevalence of contraceptive sterilization

Trends in the rate of sterilization for the three countries are depicted in Figure 1 as an annual series of rates for the decade 1964–74. These sterilization rates have been reconstructed from the dates of sterilization reported in the WFS interviews. Because the surveys did not interview women over 49 years of age, rates reconstructed for a period *x*

FIGURE 1 Annual sterilization rates (male and female) per 1,000 ever married women aged 20–39, during ten years prior to World Fertility Survey



* Rates for Korea are based on only ten months' exposure in 1974.

years ago are restricted to women under 49 - x years of age. To avoid a truncation bias, the rates in Figure 1 for each given year are expressed as the number of (male and female) contraceptive sterilizations per 1,000 ever married women aged 20–39 (as of the midpoint of the year).

The takeoff point occurred earliest in Fiji, accelerated rapidly, and had reached the highest level of the three countries by 1974. In Sri Lanka and Korea, the growth started later and proceeded more gradually, but it sharply accelerated in the last few years. As already noted, the growth in sterilization rates has been very pronounced in Korea since 1974, so that Korea may conceivably now have a higher rate than the other two countries.

The proportions sterilized by marriage duration[3] are shown in Figure 2 according to two measures: simple and synthetic. The "simple" measure is the proportion sterilized by current marriage duration—that is, the proportion of women (couples) at each duration who were sterilized at any time prior to the date of interview. The "synthetic" measure represents the proportion of women (couples) sterilized as implied by the duration-specific rates prevailing in the five years preceding the interview. The synthetic measure projects the distribution of sterilization on the assumption that women will continue to experience recent sterilization rates throughout their lifetimes. As Figure 2 indicates, the synthetic rates are substantially higher than the simple rates in each country. Since the popularity of sterilization has increased considerably in recent years in all three countries (Figure 1), this finding could have been anticipated. The decline in simple proportions sterilized through the higher marriage durations in Sri Lanka and Korea most probably reflects the recency of sterilization in these countries. That is, women married for longer periods spent many of their childbearing years during a time when interest in and availability of sterilization were limited. In Fiji, the synthetic cumulative probability of becoming sterilized within 30 years after first marriage reaches 0.54, considerably higher than the values of 0.38 in Sri Lanka and 0.17 in Korea. It is important to stress that these are hypothetical values projected from the duration-specific sterilization rates observed for the five-year period preceding the survey (1970–74 or 1971–75).

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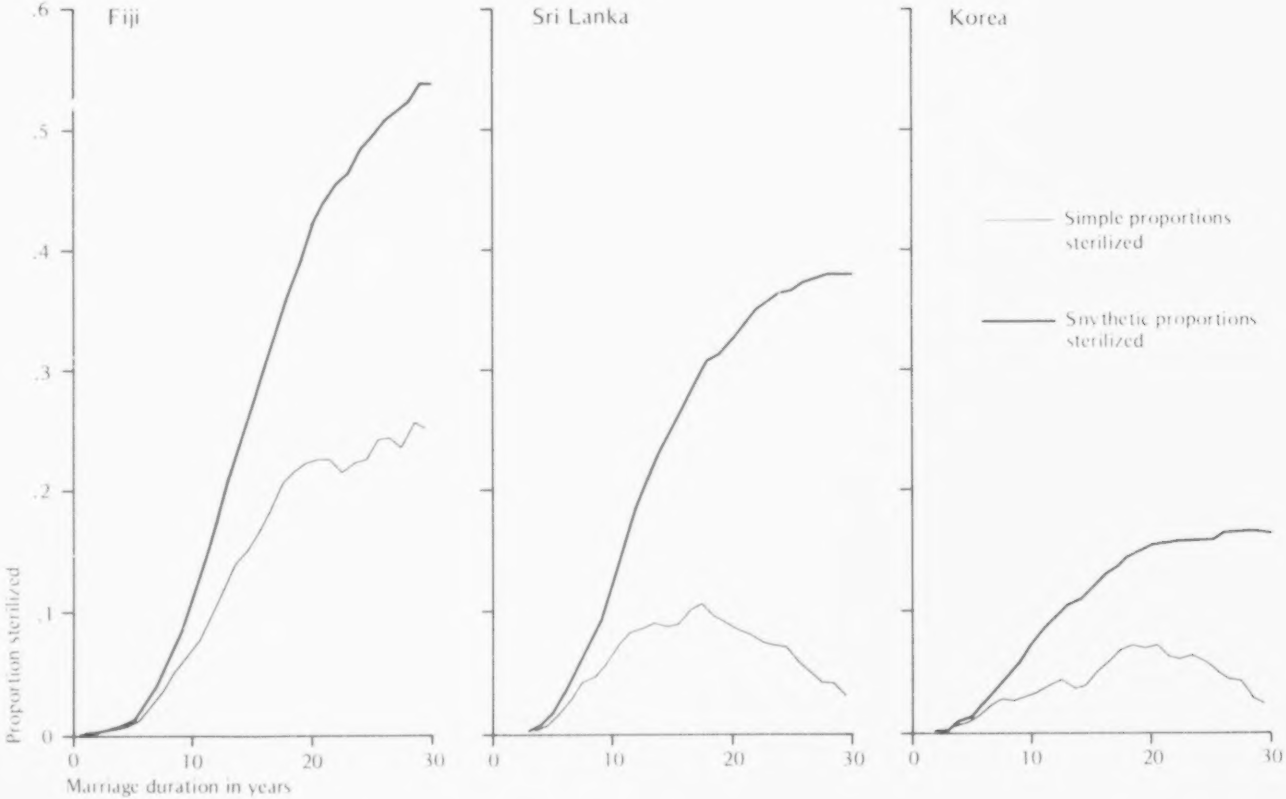
[3] The measures requiring estimates of unwanted fertility that were also developed in the WFS report on Panama are not used here because such data were not available in the Fiji survey.

FIGURE 2 Proportions sterilized by marriage duration



Characteristics of the sterilized

Are certain groups in the population more likely than others to elect sterilization? Are any group differentials common to all three countries? These questions are approached in Tables 1 and 2. In Table 1, the percentage sterilized among currently married, fecund women who wanted no more births is calculated for a variety of life-cycle and social characteristics, and is compared with the percentage using other efficient methods of contraception (pill, IUD, diaphragm, other female "scientific" methods, and the condom). This comparison is intended to elucidate the difference between selection of a permanent highly effective method and selection of other highly effective but nonpermanent methods. In Table 2, the cumulative synthetic probabilities of ever married couples becoming sterilized, based on sterilization rates in the most recent five-year period, are shown at five-year intervals for many of the same variables. These synthetic rates offer a more contemporaneous picture of the characteristics associated with sterilization than the simple percentages shown in Table 1. Since Tables 1 and 2 contain a great amount of detail, we will simplify the discussion by focusing initially on Fiji, which had the highest prevalence rates for the period under examination. Because of the longer history of sterilization in Fiji, the structure of associations may be more stable.

We found a direct relationship to exist between the percentage sterilized and the age of women and duration of marriage. This pattern was exactly reversed for the percentage using other efficient methods. Such complementarity simply indicates that women in Fiji used the pill and other methods in the early years and tended to shift to sterilization in the later years. It is important to keep in mind that the denominator in Table 1 is women who wanted no more births.

There was a distinct tendency in Fiji for women who married at older ages (Tables 1 and 2) and for women whose first birth occurred at older ages (Table 1) to experience lower sterilization rates and a slight tendency for such women to rely disproportionately on other efficient methods. This pattern was not simply a function of duration of marriage; the synthetic rates in Table 2 show this association at 20, 25, and 30 years of marriage.

Two fertility variables–number of children ever born and number of births in the first five years of marriage–are included in both tables. The proportions sterilized tend to increase up to parity 5 or 6 and then to flatten out in Fiji and Sri Lanka and to decline in Korea. This nonmonotonic pattern has at least two plausible explanations: Women in the highest parities spent much of their reproductive period during

TABLE 1 Percentage of currently married, fecund women wanting no more births who were contraceptively sterilized or using other efficient methods, by various social and demographic characteristics

	Percentage sterilized			Percentage using other efficient methods			Number of women		
Characteristics	Fiji	Korea	Sri Lanka	Fiji	Korea	Sri Lanka	Fiji	Korea	Sri Lanka
All characteristics	35.6	8.0	17.7	19.6	31.7	42.2	2,057	3,098	3,436
Age of women									
15–19	0.0	*	3.1	23.8	*	41.9	21	1	25
20–24	4.0	0.8	5.6	23.1	15.4	34.8	173	123	280
25–29	25.3	3.2	17.4	23.3	28.2	41.0	387	618	594
30–34	40.1	7.4	20.8	21.0	33.8	34.7	514	849	797
35–39	42.5	9.4	20.5	18.8	39.4	43.3	452	819	814
40–44	42.3	10.4	19.0	17.1	27.6	47.6	345	536	538
45–49	50.3	19.7	13.7	9.7	20.4	55.4	165	152	387
Years of marriage									
0–4	3.6	1.2	4.0	23.2	17.4	33.2	138	327	210
5–9	16.8	6.4	13.6	22.3	31.4	31.6	328	739	645
10–14	35.0	7.6	22.9	25.6	36.0	38.3	434	656	782
15–19	41.0	8.7	19.6	18.9	39.8	45.7	439	653	738
20–24	45.5	11.4	21.2	16.9	29.6	45.6	378	422	563
25–29	48.0	13.6	14.6	14.5	24.7	56.4	227	235	373
30 or more	51.4	13.8	10.3	6.4	21.5	59.6	109	65	124
Age at first marriage									
<15	47.9	6.1	16.6	14.8	26.5	54.0	384	49	530
15–17	37.2	8.8	19.7	18.9	31.1	43.5	725	531	1,007
18–19	33.4	8.5	17.2	19.8	35.9	41.3	470	743	609
20–21	27.3	6.5	16.4	21.9	31.2	38.4	256	794	490
22–24	20.6	7.6	17.2	27.1	29.8	37.3	155	722	425
⩾25	28.4	10.4	16.7	26.9	28.6	34.5	67	259	375

Age at first birth									
⩽15	49.2	*	16.7	15.2	*	56.3	244	8	227
16–17	38.4	8.4	18.7	19.1	31.8	50.8	424	107	447
18–19	37.6	11.5	18.3	17.7	32.8	43.0	528	476	677
20–24	30.7	7.0	17.8	22.0	32.6	40.0	701	1,950	1,353
⩾25	21.1	8.8	17.2	23.8	28.4	36.6	128	545	703
Children ever born									
0–1	5.7	0.6	1.6	6.8	6.3	40.1	88	158	187
2	7.5	6.3	4.3	27.1	32.1	36.9	199	495	432
3	14.8	9.5	15.1	28.2	32.7	38.5	284	698	564
4	32.7	9.7	19.1	20.6	36.3	40.8	306	647	565
5	41.1	7.2	23.6	21.7	30.6	43.9	314	461	472
6	51.8	10.5	24.7	15.7	36.6	42.2	255	305	383
7	51.4	7.8	22.7	16.7	32.2	44.1	216	180	287
8	46.6	6.7	19.2	13.7	24.4	49.3	146	90	234
⩾9	52.2	1.6	24.6	14.5	27.0	50.8	249	63	311
Births in first 5 years									
0	33.9	*	12.1	15.2	*	51.5	118	16	123
1	31.4	10.1	13.5	17.3	29.3	60.6	341	710	676
2	35.5	17.8	17.3	22.2	35.3	43.5	785	1,538	1,602
3	43.7	15.1	26.5	18.0	38.3	33.3	538	337	729
⩾4	48.2	*	25.3	16.8	*	37.5	137	15	78
Contraceptive history									
Used efficient method	27.5	5.9	15.0	na	na	na	1,174	2,093	851
Used only inefficient method	36.8	8.4	13.9	na	na	na	288	166	885
Never used	50.9	13.1	20.7	na	na	na	595	873	1,720
Wanted staius of last child									
Wanted	36.9	7.0	8.2	18.5	30.8	42.1	1,302	1,708	1,719
Not wanted	33.4	9.1	9.5	21.6	32.7	41.8	751	1,390	1,678

TABLE 1 *(continued)*

Characteristics	Percentage sterilized			Percentage using other efficient methods			Number of women		
	Fiji	Korea	Sri Lanka	Fiji	Korea	Sri Lanka	Fiji	Korea	Sri Lanka
Current residence									
Urban	36.6	9.6	22.7	21.1	31.7	33.4	795	1,855	662
Rural	35.1	5.5	16.2	18.5	31.6	42.8	1,256	1,243	2,480
Literacy									
Yes	31.5	9.2	19.1	20.5	32.2	36.8	1,430	2,574	2,540
No	44.9	5.7	13.7	17.7	29.3	58.0	621	522	894
Years of education[a]									
None	46.0	7.4	14.0	15.5	30.5	58.0	530	594	753
1–5	40.3	4.4	17.4	21.9	34.4	45.0	397	366	1,410
6–9	30.9	6.1	19.5	20.1	33.7	32.6	964	1,310	860
⩾10	18.1	12.8	21.4	24.1	28.2	24.4	166	822	413

* Percentage not calculated because of small number of cases in this category.

na–not applicable.

[a] Categories only approximately equal across countries.

TABLE 2 Synthetic cumulative probability of contraceptive sterilization by years since first marriage, for ever married women by selected characteristics

Country and characteristic	Years since first marriage 5	10	15	20	25	30
FIJI						
All characteristics	.011	.111	.275	.422	.493	.539
Place of residence						
Suva	.006	.080	.238	.345	.386	.466
Other urban	.029	.178	.350	.539	.594	.665
Rural	.006	.098	.261	.403	.485	.514
Age at marriage						
<15	.000	.030	.167	.369	.508	.574
15–17	.004	.109	.303	.470	.547	.579
18–19	.007	.131	.332	.466	.506	.533
20–21	.010	.106	.251	.376	.395	.409
⩾22	.026	.105	.171	.245	.274	.274
Births in first 5 years						
<2	.000	.022	.092	.212	.293	.387
2	.002	.081	.282	.469	.538	.578
>2	.054	.265	.449	.571	.633	.637
Children ever born						
0–2	.001	.013	.020	.041	.070	.070
3–4	.020	.131	.231	.308	.345	.390
⩾5	.438	.519	.557	.594	.594	.594
Years of education						
None	.078	.217	.425	.527	.625	.663
1–4	.010	.133	.287	.467	.529	.599
5–7	.013	.104	.245	.386	.434	.455
8	.006	.099	.252	.407	.430	.458
⩾9	.005	.042	.187	.381	484	.484
Ethnic group						
Fijian	.007	.056	.170	.295	.334	.339
Indian	.015	.163	.372	.533	.619	.674
Other	.000	.000	.128	.322	.382	.382
Religion						
Methodist	.008	.059	.194	.323	.377	.389
Catholic	.000	.014	.065	.155	.155	.155
Hindu	.009	.165	.369	.538	.620	.673
Islam	.036	.153	.366	.495	.598	.658
Other	.020	.116	.281	.493	.532	.532

TABLE 2 *(continued)*

Country and characteristic	Years since first marriage 5	10	15	20	25	30
KOREA						
All characteristics	.012	.073	.119	.153	.159	.167
Place of residence						
Urban	.017	.102	.168	.204	.206	.211
Rural	.000	.015	.035	.069	.079	.090
Age at marriage						
<18	.000	.032	.048	.076	.090	.099
18–19	.000	.023	.075	.114	.114	.114
20–21	.003	.059	.103	.134	.134	.156
22–24	.014	.082	.144	.193	.193	.193
⩾25	.035	.166	.206	.206	.206	.206
Births in first 5 years						
<2	.000	.039	.082	.111	.125	.128
2	.016	.078	.130	.164	.164	.183
>2	.013	.111	.131	.201	.201	.201
Children ever born						
0–2	.015	.049	.072	.072	.072	.072
3–4	.007	.082	.148	.181	.193	.193
⩾5	.000	.009	.035	.079	.084	.096
Education						
None	.000	.027	.070	.115	.124	.131
<6	.000	.033	.055	.069	.069	.069
6	.000	.035	.073	.102	.111	.116
7–9	.026	.110	.176	.210	.210	.319
⩾10	.027	.187	.282	.345	.345	.345
Religion						
None	.004	.044	.073	.106	.114	.120
Buddhist	.031	.096	.153	.183	.188	.203
Protestant	.017	.165	.296	.355	.355	.355
SRI LANKA						
All characteristics	.016	.121	.251	.324	.369	.380
Place of residence						
Urban	.030	.161	.344	.415	.453	.460
Rural	.015	.110	.232	.300	.346	.355
Estate	.000	.120	.197	.310	.352	.390

TABLE 2 *(continued)*

Country and characteristic	Years since first marriage 5	10	15	20	25	30
SRI LANKA *(continued)*						
Age at marriage						
<15	.007	.087	.207	.308	.356	.375
15–17	.008	.103	.275	.362	.437	.452
18–19	.015	.120	.261	.352	.360	.363
20–21	.004	.135	.276	.342	.362	.362
⩾22	.029	.133	.216	.236	.275	.275
Births in first 5 years						
<2	.000	.039	.118	.170	.208	.211
2	.007	.124	.263	.340	.386	.404
>2	.040	.217	.390	.479	.526	.533
Children ever born						
0–2	.008	.014	.036	.046	.050	.050
3–4	.028	.181	.260	.284	.284	.284
5–6	.000	.132	.353	.419	.447	.456
⩾7	.000	.011	.185	.327	.405	.522
Years of education						
None	.004	.079	.153	.259	.297	.315
1–5	.013	.099	.250	.317	.363	.374
6–9	.008	.135	.293	.350	.407	.410
⩾10	.042	.177	.260	.330	.390	.390
Ethnic group						
Sinhalese	.020	.140	.280	.348	.395	.403
Sri Lanka Tamil	.007	.086	.192	.262	.295	.301
Indian Tamil	.000	.079	.179	.292	.337	.375
Sri Lanka Moor	.021	.053	.130	.203	.241	.261
Religion						
Buddhist	.022	.136	.283	.353	.402	.411
Hindu	.004	.083	.167	.259	.301	.325
Moslem	.020	.051	.131	.202	.238	.256
Christian	.000	.152	.276	.325	.345	.345

years when sterilization rates were low; and women who became sterilized tended to elect the operation before they reached the highest parities, so that women with more than six births may actually have been less interested in terminating fertility than women of lower parity. A more systematic pattern is evident in the number of births during the first five years of marriage. In Sri Lanka, for example, the synthetic probability of being sterilized within 30 years of marriage (Table 2) rises from 0.21 for women with fewer than two births in the first five years to 0.40 for those with two, to 0.53 for women with more than two births in the early years of marriage.

Whether persons electing to be sterilized for contraceptive reasons are drawn primarily from a population already using contraception or not should be of considerable interest to those working in family planning programs. The evidence (Table 1) indicates that the probability of being sterilized was greater in all three countries for those who had never used any method of contraception. In Fiji and in Korea, but not in Sri Lanka, there is some further evidence that couples using the most efficient methods were less likely to elect sterilization than those using inefficient methods.

There is no evidence that the wanted status of the last birth was related to the decision to be sterilized. Women whose last birth was wanted were just as likely to become sterilized as those whose last birth was unwanted. This appears to be a consequence of the finding that prior to sterilization, sterilized couples had higher rates of both unwanted and wanted fertility than nonsterilized couples.

We also explored the implications of the sex composition of living children and found a slight tendency for Koreans whose last child was male to be more likely to be sterilized or using more efficient methods of contraception. No such relationship existed for Fiji or Sri Lanka. Because of the small number of couples sterilized by 1974 in Korea, we did not undertake a more detailed analysis that would hold constant parity and vary the number of sons.

The data in Tables 1 and 2 suggest that Koreans and Sri Lankans living in rural areas were less likely to be sterilized than those in urban areas, as might be expected from the tendency of medical facilities to be located in urban areas. But in Fiji the lowest sterilization rates were found in the capital city (Table 2). The isolation of rural areas thus appears to depend in part upon the geographic size of the country.

The relationships of literacy (Table 1) and years of education (Tables 1 and 2) to sterilization frequencies show interesting contrasts in the three countries examined. In Korea and Sri Lanka, there was a positive association, with the largest percentages sterilized found among women with more than nine years of education (Table 1). In Fiji, however, higher sterilization rates were associated with less education, uneducated or illiterate women showing the highest rates.

Table 2 includes information on ethnicity and religion. In Fiji, Indians were twice as likely as Fijians to elect sterilization (by 30 years of marriage), the respective probabilities being 0.67 and 0.34. This ethnic difference may be related to differentials in education; the Indians had a much lower educational achievement than the Fijians. In Sri Lanka, the Sri Lanka Moors showed the lowest sterilization rates and the Sinhalese the highest.

We found no particular pattern by religion across countries. In Fiji, the Hindu and Islamic populations showed the highest sterilization rates and the Catholics the lowest, but in Sri Lanka the Moslems had the lowest and the Buddhists the highest sterilization rates. In Korea, the Protestant minority had the highest rate and those reporting no religion the lowest.

Timing of sterilization

That contraceptive sterilization is a recent phenomenon is indicated in Table 3 by the finding that more than half of the procedures occurred in the first four or five years after 1970. In Sri Lanka, over three quarters of the operations took place after 1970, but the survey occurred approximately a year later there than in the other two countries.

There is a roughly similar pattern across countries in the age at which sterilization was elected, with about two thirds of the couples undergoing the operation when the wife was between ages 25 and 34. Because of the later age at marriage in Korea, fewer Koreans in the youngest age groups, but a higher proportion in the early years of marriage, were sterilized. Furthermore, the parity distribution at the time of sterilization was lower in Korea: parities 3 and 4 were much more common than the higher parities in Korea, whereas in Fiji and Sri Lanka there was an approximately even distribution at higher parities (4 to 7 in Fiji and 3 to 7 in Sri Lanka).

In Fiji and Sri Lanka most sterilizations were postpartum, 71 percent and 64 percent, respectively. In Korea, on the other hand, only 10 percent of the sterilizations were postpartum, another 30 percent occurred in the remaining part of the first year following the last birth, and 43 percent occurred in the next three years. This reversal in Korea was undoubtedly due to the preponderance of vasectomies there (two thirds of all sterilizations being vasectomies).

The last panel in Table 3 indicates that Fijian couples were most likely to opt for sterilization immediately after the birth of the last wanted child.

TABLE 3 Percentage distribution of sterilized couples by timing of contraceptive sterilization

Timing	Fiji	Korea	Sri Lanka
Year of operation			
1970 or later[a]	54.9	58.6	76.6
1965–69	26.4	21.7	17.7
1960–64	16.0	19.3	4.7
1955–59	2.3	0.4	0.9
1950–54	0.4		0.0
All years	100.0	100.0	100.0
Age (women) at sterilization			
<25	13.6	0.8	7.4
25–29	24.3	28.1	30.5
30–34	34.7	43.4	30.8
35–39	19.5	23.3	22.7
⩾40	7.9	4.4	8.7
All ages	100.0	100.0	100.0
Years of marriage			
<5	2.3	6.4	5.2
5–9	19.8	32.1	25.9
10–14	33.4	31.7	34.8
15–19	26.0	20.5	19.2
⩾20	18.6	9.2	14.9
All years	100.0	100.0	100.0
Parity			
<3	3.1	12.8	4.5
3	5.6	26.5	14.1
4	13.4	26.1	17.0
5	17.2	13.2	18.1
6	18.2	12.4	15.2
7	15.0	6.0	10.9
8	9.2	2.4	7.2
9	7.1	0.4	5.5
⩾10	11.3	0.2	7.5
All parities	100.0	100.0	100.0
Interval (months) since last birth[b]			
<1	71.2	10.4	63.8
1–12	13.0	30.1	18.8
13–24	2.9	16.5	4.1
25–36	2.5	14.1	3.6
37–48	1.9	12.4	2.4
49–60	1.6	7.2	2.6
⩾61	6.8	9.2	4.7
All intervals	100.0	100.0	100.0

TABLE 3 *(continued)*

Timing	Fiji	Korea	Sri Lanka
Interval (months) since last wanted birth			
0	52.7	30.9	30.0
1–12	10.3	6.4	10.2
13–24	7.6	8.4	10.0
25–36	8.4	11.6	13.0
37–48	5.2	8.8	8.3
49–60	2.7	5.6	7.4
⩾61	13.0	28.3	21.1
All intervals	100.0	100.0	100.0

NOTE: Percentages may not sum to 100 because of rounding.

a The surveys were conducted in 1974 in Fiji and Korea and in 1975 in Sri Lanka; thus the percentages sterilized since 1970 are not precisely comparable.

b Confined to women with at least one birth.

Births averted by sterilization

Of ultimate demographic interest is the effect of sterilization on the fertility rate. The effect depends on several factors, including the extent to which the method is used, the remaining exposure to the risk of pregnancy of those electing the method, and the assumption one makes about what the fertility of sterilized couples would have been in the absence of sterilization. We begin this analysis in Table 4, which compares the fertility of the nonsterilized with that of the sterilized prior to the operation.

Table 4 reveals that, except in Korea, the fertility of those subsequently sterilized was appreciably higher than for couples never sterilized. At the ages of completed fertility (45–49), the mean number of children ever born among sterilized couples in Fiji and in Sri Lanka exceeded by roughly 1.5 to 2.0 births the fertility of those never sterilized. Similarly, at marriage durations of completed fertility, sterilized couples had 1.2 to 1.5 more children than nonsterilized couples in Fiji and Sri Lanka. In Korea, there is only a slight fertility difference between the two groups, with nonsterilized couples generally showing higher fertility than sterilized couples. However, a more refined comparison (years of exposure among women wanting no more children) reverses the difference in Korea and shows higher fertility for the sterilized in all three countries. For sterilized couples, exposure was defined as the interval between the date of first marriage and the date of the operation; for nonsterilized couples, exposure was defined simply as the number of years married.

TABLE 4 Mean number of children ever born to ever married women by current age and years of marriage and to women wanting no more births by years of exposure to the risk of childbearing, for contraceptively sterilized and nonsterilized couples

Country and exposure factor	Sterilized	Nonsterilized	Difference
FIJI			
Current age			
25–29	4.60	2.53	2.07
30–34	5.62	3.85	1.77
35–39	6.59	4.70	1.89
40–44	7.52	5.72	1.80
45–49	7.71	6.26	1.45
Years of marriage			
5–9	4.15	2.47	1.68
10–14	5.11	3.59	1.52
15–19	6.13	4.67	1.46
20–24	6.86	5.28	1.58
25–29	7.69	6.27	1.42
⩾30	8.36	7.14	1.22
Years of exposure (among those wanting no more)			
<5	3.47	1.68	1.79
5–9	4.62	2.95	1.67
10–14	5.86	4.26	1.60
15–19	7.06	5.42	1.64
20–24	8.64	6.31	2.33
⩾25	7.97	7.44	0.53
KOREA			
Current age			
25–29	3.05	2.04	1.01
30–34	3.25	3.41	-0.16
35–39	4.06	4.46	-0.40
40–44	4.93	5.19	-0.26
45–49	5.53	5.90	-0.37
Years of marriage			
5–9	2.87	2.71	0.16
10–14	3.56	3.77	-0.21
15–19	4.00	4.50	-0.50
20–24	4.72	5.20	-0.48
25–29	6.16	5.56	0.50
⩾30	*	6.35	*

TABLE 4 *(continued)*

Country and exposure factor	Sterilized	Nonsterilized	Difference
KOREA *(continued)*			
Years of exposure (among those wanting no more)			
<5	2.19	1.66	0.53
5–9	3.09	2.85	0.24
10–14	4.25	3.90	0.35
15–19	5.45	4.66	0.79
⩾20	5.96	6.05	-0.09
SRI LANKA			
Current age			
25–29	4.22	2.38	1.84
30–34	5.10	3.58	1.52
35–39	5.86	4.74	1.12
40–44	6.92	5.35	1.57
45–49	7.78	5.85	1.93
Years of marriage			
5–9	3.55	2.35	1.20
10–14	4.61	3.59	1.02
15–19	6.03	4.63	1.40
20–24	7.03	5.59	1.44
25–29	8.17	6.34	1.83
⩾30	8.36	6.90	1.46
Years of exposure (among those wanting no more)			
<5	2.79	1.31	1.48
5–9	3.93	2.74	1.19
10–14	5.39	3.85	1.54
15–19	7.03	4.88	2.15
20–24	8.63	5.83	2.80
⩾25	8.53	6.69	1.84

NOTE: For sterilized couples exposure is defined as years married at the time of the operation; for couples not sterilized, exposure is simply number of years married.

* Average not calculated because of small number of cases in this category.

It appears from these comparisons that couples who chose contraceptive sterilization were self-selected for high fertility. Further evidence for this hypothesis is shown in Figure 3, which indicates a higher rate of unwanted fertility[4] for Korea and rather dramatically

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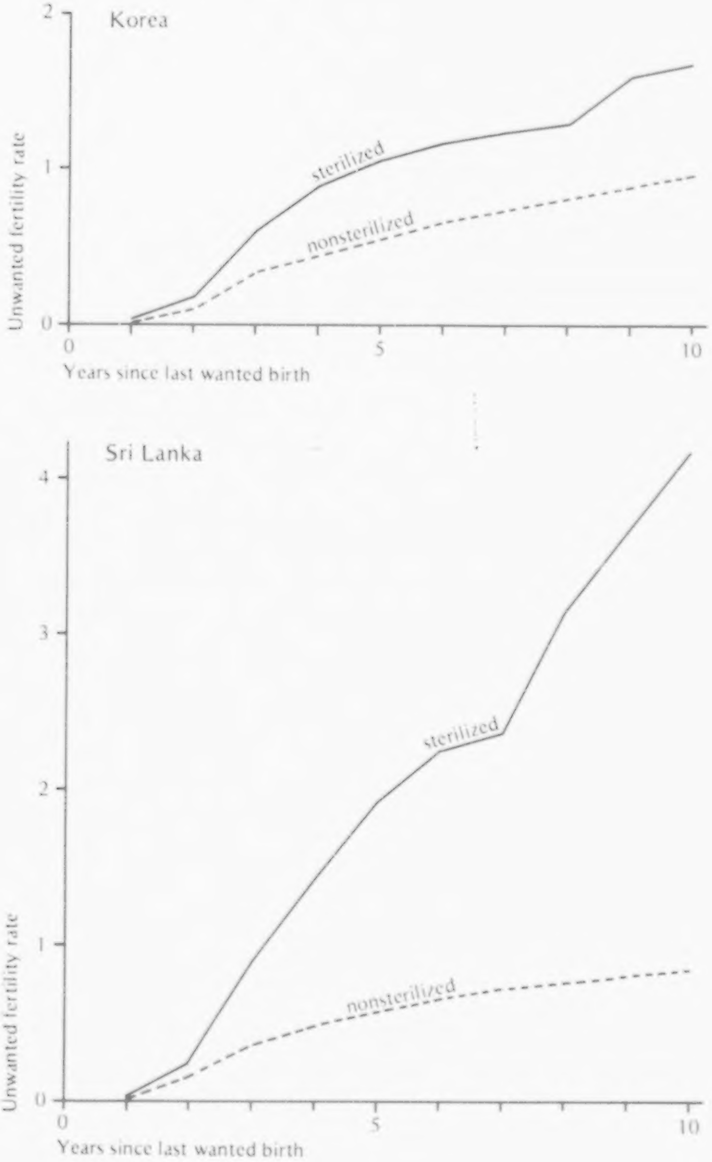
[4] The definition of unwanted fertility used in this study and the procedures for measuring it are described in Westoff et al. (1979) and in Westoff (forthcoming).

FIGURE 3 Cumulative unwanted fertility rate per nonsterilized exposure, by duration since last wanted birth, for sterilized and nonsterilized women



for Sri Lanka among women subsequently sterilized. (Because of inadequate measures of unwanted fertility, this analysis could not be undertaken for Fiji.) In Sri Lanka, the number of unwanted births ten years after the last wanted birth exceeded four among sterilized couples, compared with less than one unwanted birth among nonsterilized couples. (The comparison is based on unwanted fertility rates in the most recent five-year period).[5] Another analysis for Sri Lanka (not shown) indicates that both wanted and unwanted fertility was higher for the sterilized. For example, among Sri Lankan women with at least 25 years of exposure to the risk of childbearing (see previous paragraph for definition of exposure), the sterilized had 6.7 wanted and 1.9 unwanted births. In contrast, nonsterilized women with the same exposure had 5.6 wanted and 1.1 unwanted births.

That Korean sterilized couples showed much less selectivity for higher fertility than Fijian and Sri Lankan couples turns out to be, at least in part, the result of the extensive reliance of Koreans on abortion. When the comparison in Table 4 is made for women reporting ever or never having had an abortion, higher fertility for sterilized couples emerges clearly among those without a history of abortion. For example, among couples without reported abortions, the sterilized couples had an average of 0.60 births (the unweighted mean across years of exposure) more than nonsterilized couples, compared with an excess for sterilized couples of only 0.10 births among those reporting at least one abortion. In fact, an analysis of more recent Korean data from 1976 and 1978 surveys currently under way indicates that sterilization has a significant potential for averting abortions.

Although couples who chose sterilization had higher fertility at the same exposure intervals than couples who had not been sterilized, this finding does not answer the question of whether sterilized couples would have continued to experience higher fertility if they had not been sterilized. One could argue that their motivation to elect sterilization might have been transferred to other effective methods and consequently the assumption that their high fertility would have continued leads to an exaggeration of the number of births averted by sterilization.

The assumption used in our estimates of births averted (Table 5 and Figure 4) is that the sterilized couples would have experienced the

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[5] We have made the same calculation for Panama with a similar result: The number of unwanted births per nonsterilized exposure interval ten years after the last wanted birth was 2.9 for sterilized couples and 1.2 births for nonsterilized couples.

TABLE 5 Births averted per woman by years since first marriage, based on sterilization rates and birth rates in the most recent five-year period

Years since marriage	Cumulative births averted		
	Fiji	Korea	Sri Lanka
1	0.00	0.00	0.00
5	0.01	0.01	0.00
10	0.08	0.06	0.09
15	0.27	0.15	0.29
20	0.52	0.22	0.51
25	0.69	0.27	0.66
30	0.78	0.30	0.71

same marriage duration-specific fertility as observed for nonsterilized couples, in the absence of sterilization. These duration-specific fertility rates resulted from the combination of contraceptive and noncontraceptive practice actually observed in the population of nonsterilized couples. Although this assumption seems more defensible than some earlier methodologies, which assume a constant natural fertility schedule in the absence of sterilization, it has the drawback that some of the births occurring to nonsterilized couples are wanted births and sterilization theoretically can avert only unwanted births. The implication of this assumption is that the resulting estimates of births averted may be too high. On the other hand, the selectively high fertility of the sterilized may compensate for this overestimate.

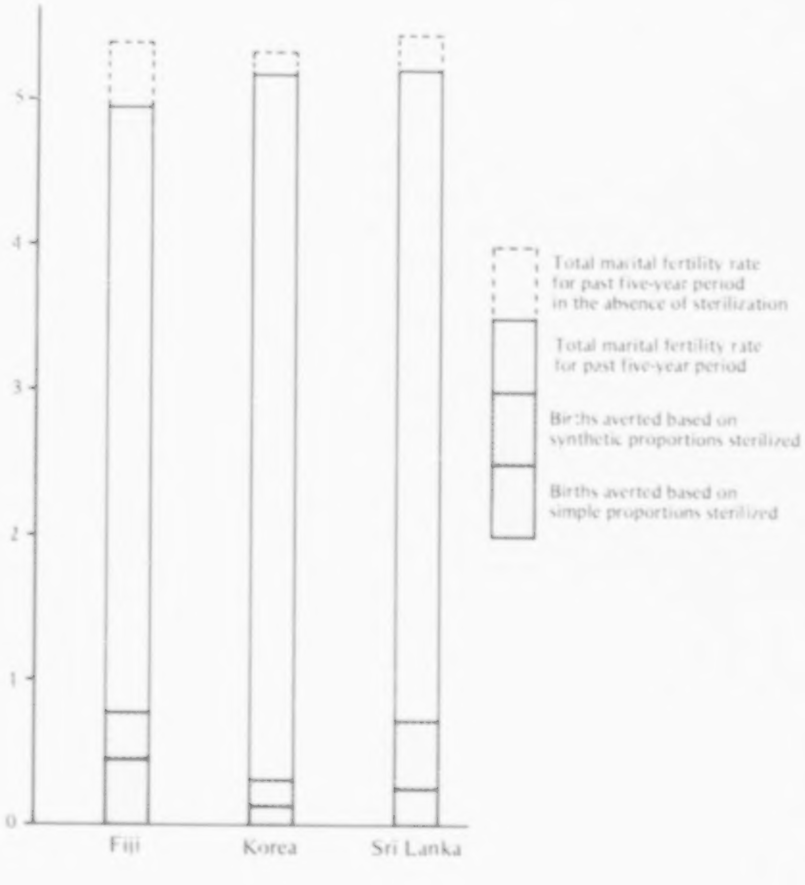
An alternative assumption is that, in the absence of sterilization, sterilized couples would have experienced the unwanted birth rates of nonsterilized couples who wanted no more births. However, the unwanted birth rates shown in Figure 3 indicate that this assumption would result in a large underestimate of births averted, because couples who eventually were sterilized appear to have been less successful at controlling their fertility than other couples. We have estimated the number of births averted for Korea and Sri Lanka using both sets of assumptions (it was not possible to calculate unwanted birth rates for Fiji). Estimates based on marriage duration-specific birth rates are presented in Table 5 and Figure 4; estimates based on unwanted birth rates are discussed briefly below. It is likely that the "true" estimate of the number of births averted falls somewhere between these two measures.

The estimates presented in Table 5 are based on the assumption that women were subject to recent fertility rates and sterilization rates (those of the last five-year period) throughout their reproductive careers. The results for Fiji and Sri Lanka are similar. In both countries, sterilization is estimated to have averted approximately three-quarters of a birth per woman by 30 years of marriage. In Korea, as a result of the low sterilization rates observed for the 1969–74 period, less than one-third of a birth theoretically would have been averted by the end of a woman's reproductive span.

The demographic implications of contraceptive sterilization are summarized in Figure 4. The measure of births averted based on the simple proportion of women sterilized indicates the amount by which the total marital fertility rate would have been higher in the most recent five-year period had no sterilizations occurred in the past. (The total marital fertility rate is defined as the sum of the marriage duration-specific birth rates during a specified period, calculated for all ever married women.) The measure of births averted based on the synthetic proportion of women sterilized represents the number of additional births that a cohort would have by the end of its reproductive career (30 years of marriage) were it subject to both the sterilization rates and the marital fertility rates of the most recent five-year period. Because sterilization rates have been increasing in all three countries, the second measure of births averted is consistently greater than the first.

The total height of each bar in Figure 4 indicates the hypothetical size of the total marital fertility rate in the absence of sterilization. As described above, it equals the sum of the estimate of births averted based on the actual proportions sterilized (the bottom segment of each bar) and the observed total marital fertility rate (the height of the bar excluding the dotted segment). The simple measures of births averted by 30 years of marriage equal 0.4, 0.1, and 0.2 for Fiji, Korea, and Sri Lanka, respectively. Expressing these measures differently, we note that, in the absence of sterilization, the total marital fertility rates for the five-year periods prior to the surveys would have been approximately 9 percent, 3 percent, and 3 percent higher, respectively. The synthetic measures of births averted yield somewhat higher estimates–0.8, 0.3, and 0.7 births averted per woman for Fiji, Korea, and Sri Lanka, respectively. These measures, which are based on the assumption that the sterilized would have experienced the marriage duration-specific birth rates of the nonsterilized in the absence of sterilization, are considerably greater than the corresponding measures

FIGURE 4 Births averted and total marital fertility rate in the past five years, after 30 years of marriage



based on the assumption that the sterilized would have experienced the unwanted birth rate of women who wanted no more births. Specifically, the latter assumptions yield synthetic measures of births averted by the end of a woman's reproductive career of only 0.1 for Korea and 0.3 for Sri Lanka. There is no way to determine which of these procedures provides a more realistic estimate of what must remain a largely theoretical calculation. Nevertheless, the calculations presented here provide a range of estimates useful for program planning purposes.

SUMMARY

We have examined the early (1970–75) experience of three countries—Fiji, Korea, and Sri Lanka—with contraceptive sterilization, a method of fertility regulation that promises to spread rapidly throughout the world. The data for these countries are from the World Fertility Survey; the methodology was developed in an earlier illustrative analysis of WFS data from Panama.

Our analysis reconstructs annual sterilization rates and calculates the cumulative probability of sterilization by duration of marriage for synthetic marriage cohorts, reflecting the experience of the five years preceding the survey. It is clear that sterilization spread earlier in Fiji, somewhat later in Sri Lanka, and even later in Korea, although subsequent studies indicate a very rapid growth in Korea in more recent years. The rates of the early 1970s imply, for ever married couples, an ultimate probability of becoming sterilized of 0.54 in Fiji, 0.38 in Sri Lanka, and 0.17 in Korea. Only in Korea do male sterilizations figure prominently; the large increase that has occurred in Korea in the last few years, however, has been largely in female sterilizations.

In all three countries, couples electing contraceptive sterilization tended to have higher fertility, especially in the early years of marriage, to live in urban areas, and never to have used contraceptive methods. Other correlates vary by country. The most interesting of these is education, which was positively related to sterilization in Korea and Sri Lanka, but negatively related in Fiji. In Fiji, the Indian population showed a much higher probability of electing sterilization than the Fijians, a difference related to the finding that educational achievement was much lower in the former group.

Analysis of the timing of sterilization shows a similar age distribution in the three countries, with about two-thirds of the operations occurring when the wife was 25–34. Most sterilizations were postpartum in Fiji and in Sri Lanka, but in Korea (where vasectomies predominated) the timing was spread over several years after the last birth.

The main demographic interest in sterilization is in assessing its significance for the reduction of fertility. At the core of this problem is the nature of the assumption that one makes about the unknown (and unknowable) level of fertility that sterilized couples would have had in the absence of sterilization. On the one hand, our analysis clearly indicates that the past fertility of sterilized couples was appreciably higher than that of other couples, at all intervals of exposure to risk. On the other hand, one could argue that the high level of motivation that led to sterilization might have led to the use of other effective

methods if sterilization had not been available. These two assumptions have opposite implications for estimates of births averted. The procedure actually followed assumes that sterilized couples would have had the same fertility as those not sterilized. One type of calculation combines the marriage duration-specific sterilization and fertility rates of the past five years and produces estimates of births averted for synthetic marriage cohorts, assuming a continuation of such rates. The numbers of births averted by these estimates were 0.8, 0.3, and 0.7 for Fiji, Korea, and Sri Lanka, respectively.

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Urbanization and the growth of small towns in Sri Lanka, 1901-71

Dayalal Abeysekera

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Urbanization and the growth of small towns in Sri Lanka, 1901-71

Dayalal Abeysekera

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PREFACE

I am most grateful to Professors Sidney Goldstein and Alden Speare, Jr., for having made many valuable comments on an earlier draft of this paper. I also gratefully acknowledge the financial support of the Ford Foundation in the form of a Traineeship in Demography, which enabled me to work toward completion of my doctoral degree in sociology at Brown University. This paper is dedicated to Shantha, who stoically bore the brunt of over three years of separation during my voluntary exile into academic incarceration.

ABSTRACT Using published census data, this paper examines the pattern of urbanization in Sri Lanka from 1901 to 1971. Like most South Asian countries, Sri Lanka shows a low level of urbanization. The annual urban growth rate for the seventy-year period has been well under 3 percent, while the national population has grown by less than 2 percent per annum. Contrary to the widely held belief that medium-sized towns have dominated urbanization in Sri Lanka, this paper demonstrates that the highest growth rates have occurred in the small towns during most of the century and that this phenomenon has created a pattern of decentralized urbanization. In addition, mitigated primacy and metropolitanization have characterized the growth of the capital city of Colombo during the recent past.

The paper reviews several factors affecting urban growth (amid ruralward migration) and creating an incipient pattern of decentralized urbanization. Urbanization is postulated as a response to the demands of the political economy of the country.

In attempting to document and analyze the process of urbanization that has occurred in Sri Lanka during the twentieth century, I will place special emphasis on the differential growth of large and small towns and on the possible determinants and consequences of that differential growth. To provide a frame of reference for documenting the growth of town types, I will first briefly discuss problems of definition associated with the concept of "urban." Next I will examine the urban-rural composition of the country and its 22 districts, which I have grouped into five regions for easier comprehension. Finally I will probe the nature of the growth of town types and identify some factors that may have affected this particular pattern of urbanization. The basic source of data in documenting the processes of urbanization is published census tabulations.

PROBLEMS OF DEFINING URBANIZATION

The definition of "urban" is beset with many unresolved issues. Some countries use the criterion of population size per locality (areas with 2,000, 2,500, 5,000, or 10,000 or more inhabitants, for example), whereas others use gazetted townships, local government units, or other such definitions to describe the urban population (see, for instance, various editions of the United Nations *Demographic Yearbook*).

Sri Lanka uses local government areas to define the urban population. As might be expected, the census definition of "urban" has changed over time. Before considering changes in its definition, it is worthwhile to explore the process by which a locality inherits urban status and also to get some insight into the arbitrariness that clouds the process. Jones and Selvaratnam (1970:200) have stated:

> In Ceylon, urban status is conferred by the Minister of Local Government for local administrative purposes and the classifications are, in ascending order, Town, Urban and Municipal Councils. Towns can graduate from one status to the next. There are no definite criteria to guide the Ministry in its decisions. According to the Department of Town and Country Planning, ministerial discretion in the creation of new Town Councils, in the absence of such criteria, seems to be based on the nature of the development . . . [of the locality] . . . or its amenities and urban character. These are not defined and are vague, but apparently, accessibility of the locality and the availability of electricity are given some weight. There is no question that personal and political consideration are also of some importance in the creation of new Town Councils, the upgrading of Town Councils to the higher status of Urban Councils, and the upgrading of Urban Councils to Municipal Councils.

Any locality coming under the purview of a village council is defined as "rural" by the Department of Census and Statistics.

The basic problem of such procedures for defining an urban area is that urban areas so defined lack consistency "in demographic, occupational, sociological or morphological terms" (Jones and Selvaratnam, 1970:199). For instance, in 1901 five localities with populations of 20,000 or more were classified as urban whereas 13 localities with fewer than 5,000 people were also classified as urban. By 1971 the situation had not changed very much; urban areas comprised 34 localities with 20,000 or more inhabitants and 40 areas with fewer than 5,000. Another problem related to this procedure is the existence of urbanized villages, about which Jones and Selvaratnam (1970:200) have commented: "The Department of Town and Country Planning [n.d.] states that there are many urbanized villages with populations exceeding 5,000, with developed socio-civic institutions, transport facilities, and electricity supply, which indeed are comparable to most Town Councils in terms of urban character, but which have not been accorded Town Council status."

In 1971 a total of 56 localities having more than 5,000 inhabitants, three of them with over 10,000 people, were still classified as rural (Table 1). More than three-quarters of these "villages" were in the Colombo and Jaffna districts, although other regions were also af-

TABLE 1 Number of villages of specified population size by district: Sri Lanka, 1971

District	10,000+	5,000–9,999	2,000–4,999	1,000–1,999	500–999	≤500	All sizes
Colombo	1	18	146	175	168	316	824
Kalutara	0	2	61	139	129	206	537
Kandy	0	0	23	141	328	1,091	1,583
Matale	0	0	2	128	124	490	744
Nuwara Eliya	0	0	0	19	82	489	590
Galle	0	0	16	123	257	685	1,081
Matara	1	3	56	125	158	238	581
Hambantota	0	0	3	26	139	638	806
Jaffna	1	23	54	52	51	119	300
Mannar	0	0	4	3	22	318	347
Vavuniya	0	0	4	7	25	315	351
Batticaloa	0	2	17	35	53	352	459
Amparai	0	3	26	64	58	117	268
Trincomalee	0	0	13	16	30	156	215
Kurunegala	0	0	4	100	358	3,045	3,507
Puttalam	0	0	20	46	123	599	788
Anuradhapura	0	0	6	20	76	1,372	1,474
Polonnaruwa	0	2	13	39	35	113	202
Badulla	0	0	13	54	158	767	992
Moneragala	0	0	4	16	60	546	626
Ratnapura	0	0	0	105	161	1,119	1,385
Kegalle	0	0	14	114	272	621	1,021
All districts	3	53	499	1,547	2,867	13,712	18,681

SOURCE: Department of Census and Statistics (1975: table 18).

fected. On the other hand, 40 out of 135 localities defined as urban in 1971 had fewer than 5,000 inhabitants (Department of Census and Statistics, 1972:5–35). Though the criterion used in this instance was a purely demographic one, it serves to point out the anomalies pervading the classification of urban areas in Sri Lanka; other criteria would similarly reveal nonuniformities.

The definition of "urban" has undergone few changes since the turn of the century. From 1901 until 1946, any area governed by a municipal council, urban council, or local board was defined as urban. (The last category included only one area, Minuwangoda in Colombo district.) After 1946 the local board area was deleted from areas defined as urban and in the 1953 census only areas with municipal or urban councils were classified as urban; areas under town or village councils were defined as rural. By 1963 areas under town councils had been upgraded from rural to urban status, and this is the definition of urban area that currently prevails.

The other obstacles to tracing time-series data on urbanization are associated with geographic changes—annexations and deletions of territory. The geographic boundaries of urban areas have not remained constant over time; some of them have expanded or contracted. For instance, the municipal limits of the city of Colombo encompassed 24.48 square kilometers (9.45 square miles) in 1881; the city's land area had increased to 25.90 sq. km. (10 sq. mi.) by 1901 and from then until the census of 1953 increased at every subsequent census (Kannangara, 1954). By 1971 it was 37.32 sq. km. (Department of Census and Statistics, 1974:2). Thus the city of Colombo in 1971 was not the same geographic unit as the city of Colombo in 1901.

The use of census data uncorrected for these definitional changes, reclassifications, and annexations and deletions of territory can lead to erroneous results. For example, the change in the percentage urban from 15.3 in 1953 to 18.9 in 1963 (Table 2) is due mainly to the inclusion of "15 new Town Councils with populations ranging between 2,000 and 33,000 which were established after 1953" (Gunatilleke, 1973:43) with perhaps a minimal contribution from annexations and deletions.

Urbanization, however, being a process of change, cannot realistically be tied down to constant areas. To obtain a realistic picture of the process of urbanization, one has to estimate the size of preurban populations of spatial units that have become urban over time. In Sri Lanka, it is not possible to do this with published census data, which are, for the most part, unadjusted. Some effort toward adjustment of census data is currently being made by the Surveyor General's Department (personal communication).

URBAN-RURAL POPULATION COMPOSITION AT NATIONAL AND REGIONAL LEVELS

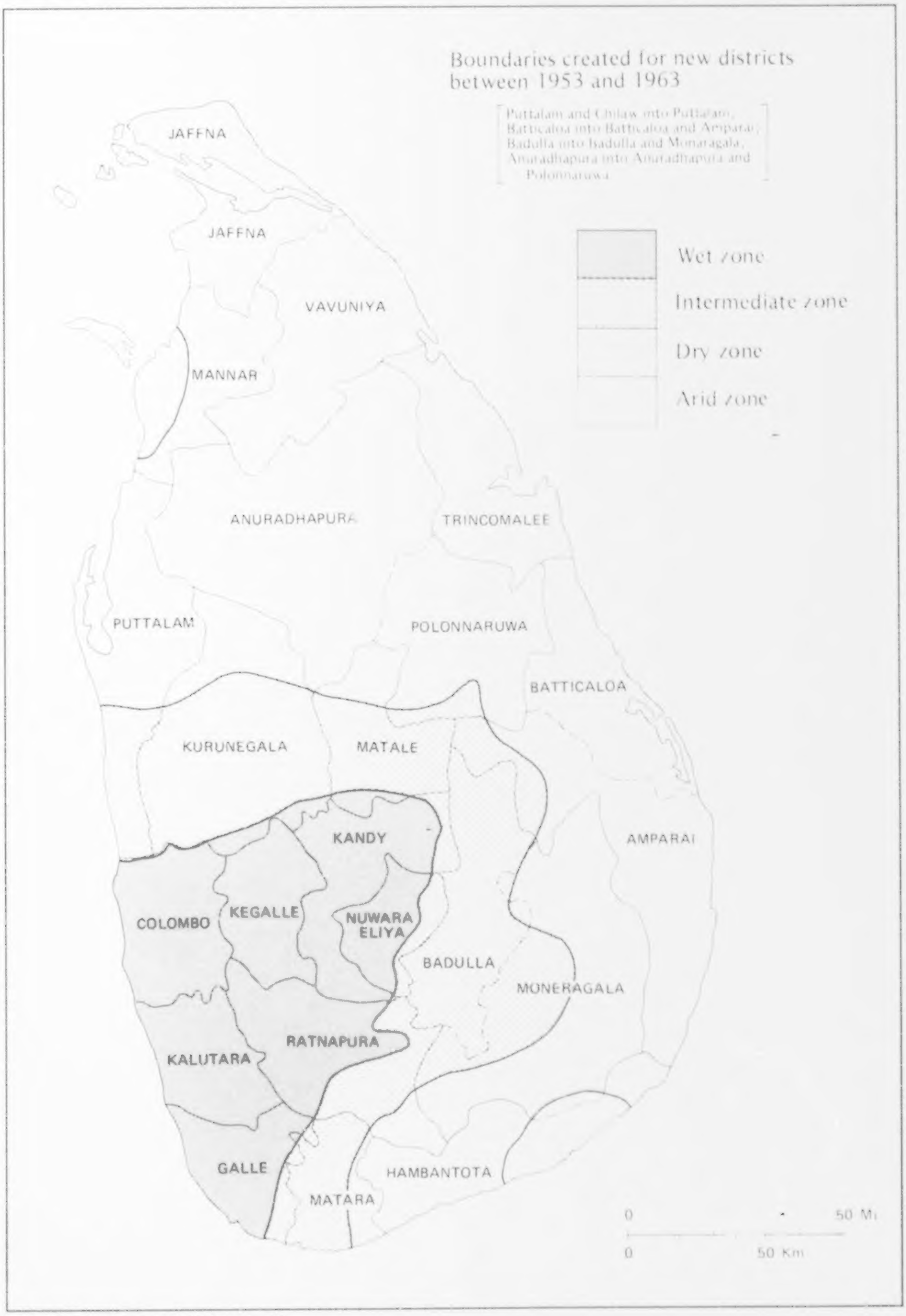
Narrowly defined, the demographic study of urbanization is concerned with the level and tempo of change in the distribution of population between urban and nonurban areas (Goldstein and Sly, 1974:8). The level of urbanization conventionally refers to the population living in urban areas expressed as a proportion of the total population at a particular time. Tempo of urbanization refers to the difference in the level of urbanization at two points in time, usually expressed as an annual rate of change.

Before turning to Table 2, one should note changes that have occurred in the number of districts of Sri Lanka (see Map 1). At the turn of the century, Sri Lanka's nine provinces had 20 districts. At the census of 1971 there were 22 districts. Comparability over time can easily be established. The changes took place between 1953 and 1963, when the districts of Puttalam and Chilaw were amalgamated to form one district and another three districts (Batticaloa, Anuradhapura, and Badulla) were divided to form six districts. The newly created districts were Amparai, Polonnaruwa, and Monaragala. Thus the 19 districts that are comparable over time are Puttalam and Chilaw, Batticaloa and Amparai, Anuradhapura and Polonnaruwa, Badulla and Monaragala, and the other 15 districts whose boundaries remained unchanged. Regional-level data presented in this paper are comparable over time because they reflect these boundary changes.

The districts of Sri Lanka have been divided into various regional groupings based on somewhat different criteria (see Department of Census and Statistics, 1973; ESCAP, 1975; World Fertility Survey, 1978). The regions identified in this paper differ slightly from the others. Because urbanization cannot be studied in isolation from dominant internal migration streams, the regional classification I have adopted depicts the destination and origin districts of the country within the broader framework of agroclimatic topography. Two dominant internal migration streams are observed in Sri Lanka, one to Colombo district containing the capital city (region A, Map 2) and the other to a collection of districts in the rural dry zone (region E), where the government has invested heavily in peasant agriculture (Abeysekera, 1979). Accordingly, these two areas are treated as two regions in this paper. Three other regions consist of the maritime districts of the wet zone (region B), the *kandyan* (hill-country) districts of the wet zone (region C), and Jaffna district (region D) in the extreme north of the dry zone.

The maritime districts are the most developed areas of the country, having been exposed to Western influences since the early sixteenth century. They include Kalutara, Galle, Matara, and Puttalam/Chilaw (the last actually situated in the intermediate zone). The *kandyan* districts are less developed and have had less exposure to Western influence; they also contain the tea plantations of the country. Furthermore, the maritime districts are inhabited predominantly by the low-

MAP 1 Administrative districts and climatic zones of Sri Lanka


Boundaries created for new districts between 1953 and 1963
Puttalam and Chilaw into Puttalam,
Batticaloa into Batticaloa and Amparai;
Badulla into Badulla and Monaragala,
Anuradhapura into Anuradhapura and
Polonnaruwa
Wet zone
Intermediate zone
Dry zone
Arid zone
JAFFNA
JAFFNA
VAVUNIYA
MANNAR
ANURADHAPURA
TRINCOMALEE
PUTTALAM
POLONNARUWA
BATTICALOA
KURUNEGALA
MATALE
KANDY
AMPARAI
COLOMBO
KEGALLE
NUWARA ELIYA
BADULLA
MONERAGALA
KALUTARA
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SOURCE: ESCAP (1975:17).

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MAP 2 Regional groupings by district

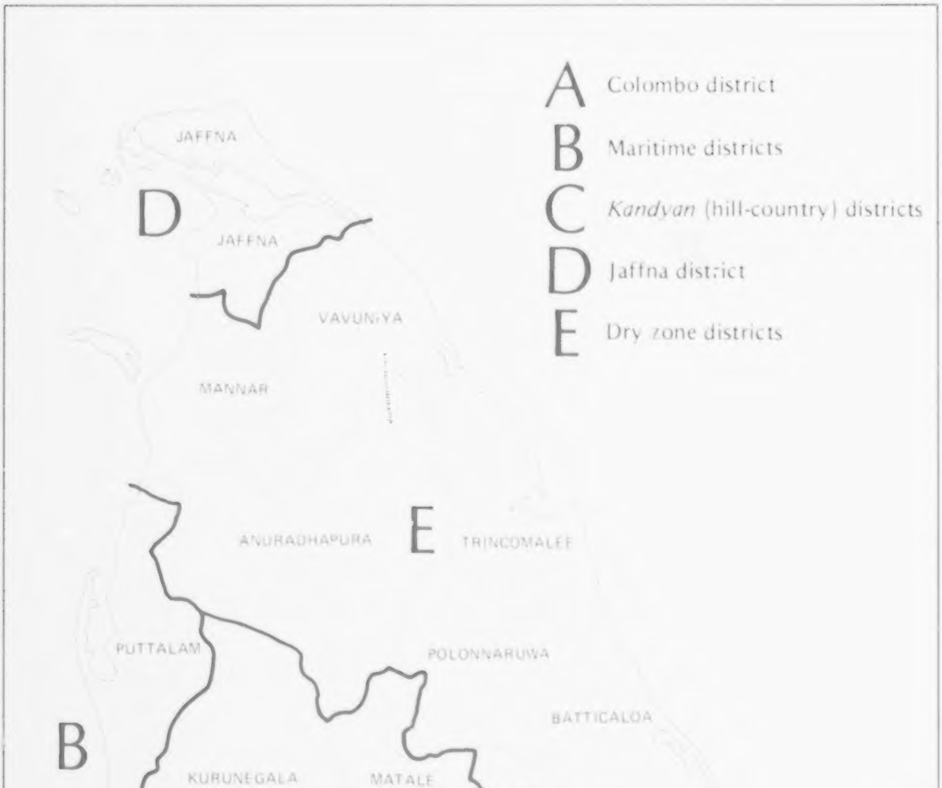
A Colombo district
B Maritime districts
C *Kandyan* (hill-country) districts
D Jaffna district
E Dry zone districts
JAFFNA
D
JAFFNA
VAVUNIYA
MANNAR
ANURADHAPURA
E
TRINCOMALEE
PUTTALAM
POLONNARUWA
BATTICALOA
B
KURUNEGALA
MATALE
KANDY
C
AMPARAI
A
COLOMBO
KEGALLE
NUWARA ELIYA
BADULLA
MONERAGALA
RATNAPURA
KALUTARA
GALLE
HAMBANTOTA
B
MATARA
0
50 Mi
0
50 Km

TABLE 2 Percentage urban in specified regions of Sri Lanka, census years 1901–71

Region	1901	1911	1921	1946	1953	1963	1971
Colombo district (wet zone)	29.6	35.3	38.3	40.7	41.5	46.5	55.0
Maritime districts[a] (wet zone)	12.2	10.7	11.0	11.1	11.0	17.6	18.0
Kandyan (hill-country) districts[b] (wet zone)	4.6	5.1	5.4	5.7	5.8	8.7	8.1
Jaffna district[c] (dry zone)	11.3	12.4	12.8	14.7	15.7	24.6	33.4
Dry zone districts[d]	7.6	7.5	7.8	11.0	8.6	16.9	19.1
All regions	11.6	13.2	14.2	15.4	15.3	18.9	22.4

a Include Kalutara, Galle, Matara, and Puttalam/Chilaw districts.

b Include Kandy, Matale, Nuwara Eliya, Kegalle, Badulla/Monaragala, Ratnapura, and Kurunegala districts.

c Jaffna "has been classified separately as the historic, ethnic and other considerations have produced a special combination of demographic and agricultural factors that deserve to be treated separately" (ESCAP, 1975:16).

d Include Hambantota, Mannar, Vavuniya, Batticaloa/Amparai, Trincomalee, and Anuradhapura/Polonnaruwa districts.

SOURCES: Computed from Department of Census and Statistics (1958: table 3; 1967: table 2; 1974: tables 14, 24).

country Sinhalese, whereas the *kandyan* districts are the home of the *kandyan* Sinhalese along with the South Indian Tamil laborer population that was imported by the British to run the plantations. Following the reasoning of ESCAP (1975:16), I have classified Jaffna district separately because "historic, ethnic and other considerations have produced a special combination of demographic and agricultural factors that deserve to be treated separately." Unlike most of the districts in the rest of the dry zone, Jaffna has been a district of net out-migration since 1946.

As Table 2 reveals, according to census definitions of "urban" the level of urbanization in Sri Lanka increased at each successive census (except for a slight dip in 1953). From 11.6 percent in 1901, the proportion of the population residing in urban areas almost doubled by 1971. Although the rise in the level of urbanization when compared with the experience of some Latin American countries is quite modest, considered within the South Asian context it is noteworthy. What Table 2 does not reveal is that in 1901 only 28 spatial units were defined as urban, but by 1971 the number so defined had grown to 135, representing more than a quadrupling of the number of urban localities (Table 3).

There is no possibility of identifying these 135 urban places of 1971 in the published census data for previous years; if this information were available, one could ascertain whether there was increasing concentration of population in these areas over time and, if so, determine the tempo of changes in concentration. In the absence of these data, however, one can identify in the 1971 urban classification the same areas that were defined as urban at previous censuses. Thus one can ascertain the proportion of urban population in these areas and compare it to the proportion urban at preceding censuses (Table 3).

Two interesting observations emerge from Table 3. First, the proportion of the population urban as defined by the 1971 census deviates by hardly more than one percentage point in either direction when

TABLE 3 Percentage urban at each census, percentage urban in 1971 in areas defined as urban at each respective census, population in census-defined urban areas as a percentage of total urban population of 1971, and number of urban areas: Sri Lanka, census years 1901–71

Item	1901	1911	1921	1946	1953	1963	1971
Percentage urban (from Table 2)	11.6	13.2	14.2	15.4	15.3	18.9	22.4
Percentage urban in 1971 in areas defined as urban at each census	11.4	14.3	14.7	14.7	14.7	u	22.4
Population in census-defined urban areas as percentage of total urban population of 1971	51.3	64.0	66.0	66.0	66.1	u	100.0
Number of urban areas	28	37	42	42	43	90	135

u–unavailable.

SOURCES: Same as in Table 2 and Department of Census and Statistics (1972: table 4).

compared with the proportion urban at each previous census (cf. rows 1 and 2). In fact, the proportion defined as urban in 1971 was lower than the proportion urban as defined by three of five previous censuses for which data exist (1901, 1946, and 1953). This comparison obscures the possible geographic expansion of urban places over time caused by boundary changes (for example, the expansion of the city of Colombo mentioned earlier) and therefore probably overstates the 1971 level of urbanization depicted in row 2. The highest positive divergence, between the censuses of 1971 and 1911 (14.3 versus 13.2 percent), is due mainly to the granting of urban status to the suburbs of Colombo City (e.g., Dehiwela-Mt. Lavinia, Kotte, Kolonnawa, and Wattala-Mabole-Peliyagoda), which alone accounted for almost one-third of the total intercensal increase in percentage urban between 1901 and 1911.

Second, relatively more of the urban population of Sri Lanka is concentrated in the earlier established localities rather than in the newly created ones. The 28 urban areas of 1901, which represent just one-fifth of the total number of urban places in 1971, contain slightly more than one-half the 1971 urban population; one-quarter of the 1971 urban places (i.e., the 37 urban localities of 1911) contain almost two-thirds of the 1971 national urban component. Conversely, over two-thirds of urban places, which came into existence after 1953, contain only one-third of the 1971 urban population. One might infer that the recent additions to the urban areas lacked potential for population growth; one might even speculate that the recently created urban places were no more than overgrown villages, possibly containing a few regional or local government offices and a bazaar with hardly any commensurate economic activity capable of sustained growth. Unfortunately, the unavailability of published census data on the proportion of the population residing in each urban area in 1963 precludes verification of this hypothesis.

Colombo district consistently reveals high levels of urbanization in comparison with other regions. It had the largest urban population at the turn of the century and maintained its ranking until 1971. In contrast, the maritime districts had the second highest proportion of urban population (12.2 percent) in 1901 but were soon surpassed by Jaffna district and recently by the dry zone districts. At the 1971 census, their level of urbanization was below the national average. The lowest level of urbanization is found among the *kandyan* districts, which have maintained their low ranking throughout the century. The two large increments in the regional proportion urban observed during

1953–63 and 1963–71 were due mainly to reclassification and have been felt in all the regions; the impact appears to have been heaviest in Jaffna district, however, followed by the dry zone districts and Colombo.

As already mentioned, urbanization and urban growth are not synonymous. Urbanization is measured by the percentage change in the proportion of the urban population to that of the total population. Urban growth, on the other hand, is measured by the percentage change in the urban population itself between two points in time. A rise in urban growth need not entail an increase in urbanization, or vice-versa. The level of urbanization rises only when the rate of growth of the urban places is higher than that of the growth rate of rural localities.

The level of urban growth in Sri Lanka is unquestionably rising, at both national and regional levels. None of the regions has recorded a decline in urban concentration within any intercensal period, although at the district level there have been a few sporadic occasions of intercensal urban decline. The magnitudes of urban growth have been much higher than those of urbanization during the twentieth century. (The same has been true in Malaysia, according to Hirschman, 1976.)

The impact of reclassification of urban areas is much greater on the measure of urban growth than on the measure of urbanization. This is due principally to the absence of the stabilizing component of total population in the former. Until the intercensal period of 1953–63, when the highest number of areas was reclassified, intercensal urban growth was well under 100 percent, the dry zone experiencing the highest proportionate growth (93.5 percent) during the 25-year intercensal period of 1921–46 (Table 4). But during 1953–63, even the *kandyan* districts almost doubled their urban populations and only Colombo district grew at a rate below the national average. The dry zone districts had a phenomenal 209.3 percent increase, due partly to the fact that the districts of Mannar and Vavuniya acquired urban status for over 15 percent of their inhabitants. Urban growth during 1963–71 was second only to that of the preceding intercensal period (a two-year difference favoring the latter); Jaffna and the dry zone districts continued to grow substantially, with Colombo following closely.

A basic difficulty in comparing rates of urban growth between censuses is due to differences in intercensal time periods. Three periods comprised 10 years each, one had 25 years, another 7 years, and yet another 8 years. To overcome this difficulty, I have computed annual

TABLE 4 Percentage of intercensal change in urban population by region: Sri Lanka, 1901–71

Region	1901–11	1911–21	1921–46	1946–53	1953–63	1963–71
Colombo district (wet zone)	42.6	21.0	63.7	22.6	44.3	43.6
Maritime districts (wet zone)	2.2	12.6	44.7	15.8	96.7	19.3
Kandyan districts (wet zone)	29.1	15.7	62.4	26.2	93.4	9.0
Jaffna district (dry zone)	19.4	4.9	47.4	23.4	95.4	56.2
Dry zone districts	4.2	12.2	93.5	6.8	209.3	50.8
All regions	31.1	17.5	60.4	21.1	62.7	41.0

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1974: table 24).

rates of urban growth (Table 5), which are a better measure of the tempo of urban growth than the intercensal rates. Table 5 assumes there was exponential change in the urban population as well as linear change between any two censuses.

TABLE 5 Percentage of annual exponential change in urban population by region: Sri Lanka, 1901–71

Region	1901–11	1911–21	1921–46	1946–53	1953–63	1963–71
Colombo district (wet zone)	3.6	1.9	2.0	2.9	3.7	4.5
Maritime districts (wet zone)	0.2	1.9	1.5	2.1	6.8	2.2
Kandyan districts (wet zone)	2.6	1.5	1.9	3.3	6.6	1.1
Jaffna district (dry zone)	1.8	0.5	1.6	3.0	6.7	5.6
Dry zone districts	0.4	1.2	2.6	0.9	11.3	5.1
All regions	2.7	1.6	1.9	2.7	4.7	4.4

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1967: table 2; 1972: table 4).

Nationally, the tempo of urban growth appears to have dropped in the second intercensal period (1911–21) and increased from then onward until 1953–63, when it peaked; in the last period a slight drop was recorded. However, the steep increase from 2.7 during 1946–53 to 4.7 during 1953–63 was an artifact of the doubling of the number of urban areas during the latter decade.

Jones and Selvaratnam (1970:204) have attempted to make a rough adjustment for the distortion caused by the reclassification of urban areas during 1953–63. They explain the method of adjustment and its rationale as follows:

> The populations of Town Councils created between 1953 and 1963 were projected backwards to 1953 and 1946 on the assumption that in both 1953–63 and 1946–53 periods, their rate of population increase was a third higher than that of the other towns that were in their town size class in the terminal year of the period under consideration. The reasoning behind this assumption was that a town probably had a better chance of being awarded Town Council status if its growth was unusually rapid, and that there is no question that some of the new Town Councils (especially those near Colombo) were growing more rapidly than other towns of comparable size.

When this adjustment is made, the rate of growth during 1953–63 drops to 2.7, which is the same as the rate that prevailed in the earlier period. But the decline, according to Jones and Selvaratnam's calculation, was not from 4.7 to 2.7 but rather from 3.6 to 2.7 (p. 201). The difference originates from Jones and Selvaratnam's having added the populations of the town councils in 1953 as found in the Registrar-General's reports to the census-defined urban population of 1953. As noted earlier, town councils were defined as rural in the 1953 census. Thus even the unadjusted data in Jones and Selvaratnam (1970) represent some degree of adjustment, which has the effect of boosting the census urban population of 1953 by 13.2 percent and increasing the number of urban places from 43 to 67.

I have made a similar adjustment of the data measuring urban growth. To ascertain the tempo of growth, I have identified in the 1971 census the areas defined as urban in the 1953 census and compared the 1971 "adjusted" urban population with the 1953 urban population. When the 1971 urban population of 1953-defined urban areas is taken as the population at t_2 and the 1953 urban population as t_1, the annual growth rate of the national urban population drops to 2.3 during the 18-year period, reflecting a decline from the 1946–53 rate of 2.7 (not shown in Table 5).

What all these adjustments point to is the extent to which urban growth and urbanization may be an artifact of reclassification. When adjustments are made for reclassification, the increase in the rate of urban growth is almost zero. As Jones and Selvaratnam (1970:205) observe, "according to this adjusted data, the urban population grew at the same rate as the rural between 1946 and 1953, and only marginally faster than the rural in the decade to 1963. In the entire 17-year period, the percentage urban increased only from 18.3 to 18.8."

Table 6 presents the comparable annual rates of growth for Sri Lanka and its regions (urban and rural areas combined). Considering the adjusted rate of urban growth for 1953–71, one observes that there was a higher rate of urban growth than of total growth only during the first half of the century. Even during this period, the greatest differential between urban and national growth rates was observed during the 1901–11 decade, when nine rural areas were reclassified as urban; these included the suburbs of Colombo City, which were growing rapidly. From 1921 to 1953, the differential growth rate between the urban population and the total population was almost negligible. In fact, since 1946 the total population has exhibited a higher rate of growth than the urban areas. As the total population contains the urban population, this means that the rural areas grew faster than the urban areas.

If one controls for effects of reclassification, the growth of a particular area is the joint function of natural increase and net migration.

TABLE 6 Percentage of annual exponential change in total population by region: Sri Lanka, 1901–71

Region	1901–11	1911–21	1921–46	1946–53	1953–63	1963–71
Colombo district (wet zone)	1.8	1.1	1.7	2.6	2.6	2.4
Maritime districts (wet zone)	1.5	0.9	1.4	2.2	2.1	1.9
Kandyan districts (wet zone)	1.5	1.0	1.7	2.9	2.6	2.1
Jaffna district (dry zone)	0.8	0.1	1.0	2.1	2.2	1.7
Dry zone districts	0.6	0.7	1.3	4.5	4.5	3.6
All regions	1.4	0.9	1.6	2.8	2.7	2.3

SOURCE: Computed from ESCAP (1975:18, table 19).

Malaria was brought under effective control in 1946 and the death rate afterward declined precipitously. Since malaria may be assumed to have been a more effective "Malthusian check" of natural increase in rural than in urban areas, the improved mortality conditions probably tipped the fertility differential in favor of rural areas, fostering population growth. The changes in the rates of growth around 1946 probably reflect this increased differential. To the extent that there was a possibility of neutralizing or reversing the growth rate of rural areas through rural-to-urban migration, the persistence of higher growth rates in rural areas indicates that the volume of rural-to-urban migration was not sufficient to accomplish this.

Another part of the picture has been the existence of a heavy stream of migration to the districts of the rural dry zone from 1946 onward. This is a rural-to-rural stream of migration from the land-hungry wet zone to the newly irrigated locations of the dry zone; insofar as it is a geographic transfer of people within rural Sri Lanka, it should not affect the counterbalancing effects of rural-to-urban migration. But as data on internal migration reveal (Abeysekera, 1979), the majority of migrants who were born in urban areas left their places of birth to live in rural areas, and this ruralward migration has had a substantial negative impact on rural-to-urban migration.

Regional data, when unadjusted for reclassification, suggest that most of the regions have generally maintained a higher rate of urban growth compared with that of the whole region. Until 1946, all regions were characterized by a less than 2 percent growth rate, whereas the postmalaria era has been conspicuous for its more than 2 percent rate of increase. The very high growth rate of the dry zone population during the latter half of the century is the most striking exception to the otherwise uniform growth pattern of the regions. During the 25 years from 1946 to 1971, the dry zone grew at the rate of 4.2 percent per annum while Colombo, the next fastest growing region, grew at only 2.5 percent per annum. This was the period during which land colonization took place in earnest, especially from 1946 to 1963; the high rate of growth resulted jointly from net in-migration and increased infant and child survivorship due to the conquest of malaria. A comparison of Tables 5 and 6 reveals that urban growth in the dry zone was a delayed phenomenon when compared with the timing of growth of the entire region. Although the growth rate of the region was 4.5 percent during 1946–53, the urban areas of the region grew by a mere 0.9 percent. It was only with reclassification of urban areas that the urban growth rate in the dry zone reached an unprecedented 11.3 percent during 1953–63.

TABLE 7 Percentage of annual growth: selected areas of Colombo district, 1901–71

Area	1901–11	1911–21	1921–46	1946–53	1953–63	1963–71
Colombo district	1.8	1.1	1.7	2.6	2.6	2.4
Urban Colombo district	3.6	1.9	2.0	2.9	3.7	4.5
City of Colombo	3.1	1.4	1.6	2.3	1.8	1.2
Dehiwela-Mt. Lavinia	[a]	3.2	3.2	4.5	3.5	4.2
Kotte	[a]	3.6	4.1	4.3	3.0	2.8
Moratuwa	−0.8	0.5	2.3	2.5	2.6	2.7

[a] Not defined as urban in the 1901 census.

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1974: table 26).

The growth rate of the city of Colombo has been consistently lower than that of urban Colombo during the 70-year period and lower than that of Colombo district since 1921 (Table 7). It is the three major suburban satellites of Colombo City, with growth rates two or three times that of the city of Colombo, that have boosted the growth rate of urban Colombo. This slow growth of Colombo City has occurred despite an areal annexation of 11.4 sq. km. (4.4 sq. mi.), representing an increase of 44 percent.

SIZE CLASS DISTRIBUTION

To the extent that there are differential patterns and rates of change among the various urban areas, neither the percentage urban nor urban-to-rural ratios are able to provide any information on such dynamics. For instance, a question such as "Have the smallest urban places grown at the same rate as the largest ones?" cannot be answered by these summary measures. Examining Indian data, Bose (1974:72) found that whereas the proportion urban increased from 11 to 20 percent between 1901 and 1971, the proportion of the city population (i.e., the urban population living in cities of 100,000 or more) increased from 23 to 56 percent during the same period. Thus he found that from the perspective of planning and policy in India the ratio of city population to that of the urban population is a more sensitive measure of urbanization than the percentage urban.

Demographers have traditionally classified urban localities by size of population. In the study of urbanization six size classes are commonly used for towns (Table 8). One must recognize, however, that the dividing points between classes are somewhat arbitrary and that the range of population size within classes varies considerably. I have selected the size classes shown in Table 8 because, first, in recent years they have become the most common ones and using them therefore facilitates cross-national comparison, and, second, they seem to reflect meaningful differences in urban functions and organization in Sri Lanka. I also use the more common terms "large town" (for urban places with 50,000 or more people), "medium town" (for places with 10,000 to 49,999 people), and "small town" (for those with fewer than 10,000).

During the 70-year period, the number of towns in all size classes grew from 28 to 135, increasing by 382 percent. Large towns increased sevenfold, medium towns by six and one-half times, and small towns by two and one-half times. Although the last group increased in absolute numbers, their relative numbers declined. Large towns accounted for 3.5 percent of all towns at the turn of the century and for 5.9 percent in 1971; the proportion of medium towns increased from 28.6 to 43.5 percent; but the proportion of small towns declined from 67.8 to 49.6 percent.

These figures, which compare the two end points of the 70-year period, do not reflect the fluctuations that took place during this span. These fluctuations become prominent when one considers urban populations of the towns expressed as a percentage of the total urban population (Table 8). At the two end points the large towns' increase is quite modest, from 37.4 to 43.5 percent. In 1953, however, large towns contained almost two-thirds of the country's urban population (63.3 percent), and also, incidentally, constituted 16.3 percent of all towns—their largest share. On closer scrutiny, it becomes evident that the performance of large towns can be divided into three phases: an initial period of stability from 1901 to 1921, a period of increasing concentration between 1921 and 1953, and a final phase of decline from 1953 to 1971. An initial period of stability is observable in medium and small towns as well, whereas both exhibited a decline in the second period and an increase in the last period. However, it must be noted that the historical performance of town types is not necessarily a function of the rate of concentration of people in urban areas; in Sri Lanka it is (confoundingly) more a function of reclassification.

Table 9 shows the performance of different size classes during five intercensal periods for which data are available, yielding information as to how many localities in a particular size class remained within that size class, moved up by one size class, or moved up by two size

TABLE 8 Number of towns by size class, percentage distribution urban population: Sri Lanka, census years 1901–71

	1901			1911			1921		
Town type and size class	Number	% of urban places	% of urban pop.	Number	% of urban places	% of urban pop.	Number	% of urban places	% of urban pop.
Large	**1**	**3.5**	**37.4**	**1**	**2.7**	**38.9**	**1**	**2.4**	**38.3**
≥100,000	1	3.5	37.4	1	2.7	38.9	1	2.4	38.3
50,000–99,999	0	0	0	0	0	0	0	0	0
Medium	**8**	**28.5**	**43.9**	**10**	**27.0**	**39.9**	**12**	**28.6**	**41.7**
20,000–49,999	4	14.3	30.7	4	10.8	25.3	6	14.3	29.7
10,000–19,999	4	14.3	13.2	6	16.2	14.6	6	14.3	12.0
Small	**19**	**67.8**	**18.8**	**26**	**70.2**	**21.2**	**29**	**69.1**	**20.0**
5,000–9,999	6	21.4	9.7	14	37.8	16.5	12	28.6	14.1
<5,000	13	46.4	9.1	12	32.4	4.7	17	40.5	5.9
All town types and size classes	**28**	**99.8**	**100.1**	**37**	**99.9**	**100.0**	**42**	**100.1**	**100.0**

NOTE: Percentages may not sum to 100 because of rounding.

SOURCES: All years except 1963: Computed from Department of Census and Statistics (1958: table 4; 1972: table 4). 1963: Jones and Selvaratnam (1970: table 2).

classes during an intercensal period. Between 1953 and 1971, for example, 34 localities were in the size class of 10,000–19,999 persons; six of them remained in the same class throughout the 18-year period, three were in the 5,000–9,999 class in 1953 but by 1971 had moved up to the 10,000–19,999 class, one moved up by two size classes, and 24 other localities not classified as urban in 1953 were so by 1971. Only shifts in size class during the longest intercensal period (1921–46) can be studied without being biased by reclassification. The 1946–53 period is minimally affected by two new additions, each of which carried fewer than 5,000 people. Almost one-quarter of all urban areas were reclassified during 1901–11, almost one-eighth during 1911–21, and more than two-thirds during 1953–71. (Published census data on individual urban locations were not available for 1963; had they been available, shifts in size classes could have been observed for the 1953–63 and 1963–71 periods and the performance of almost half of the areas that became urban through reclassification during 1953–71 could have been documented during 1963–71.)

of size classes, and population in size classes as percentage of total

1946			1953			1963			1971		
Number	% of urban places	% of urban pop.	Number	% of urban places	% of urban pop.	Number	% of urban places	% of urban pop.	Number	% of urban places	% of urban pop.
5	**11.9**	**57.0**	**7**	**16.3**	**65.3**	**7**	**7.8**	**50.1**	**8**	**5.9**	**43.5**
1	2.4	35.4	1	2.3	34.4	2	2.2	31.1	3	2.2	29.0
4	9.5	21.6	6	14.0	30.9	5	5.6	19.0	5	3.7	14.5
18	**42.9**	**34.4**	**21**	**48.9**	**29.7**	**39**	**43.3**	**38.3**	**60**	**44.5**	**45.5**
5	11.9	17.3	6	14.0	12.5	18	20.0	24.4	26	19.3	28.2
13	31.0	17.1	15	34.9	17.2	21	23.3	13.9	34	25.2	17.3
19	**45.2**	**8.6**	**15**	**34.9**	**5.0**	**44**	**48.9**	**11.6**	**67**	**49.6**	**11.0**
7	16.7	5.5	4	9.3	2.4	23	25.6	7.9	27	20.0	6.7
12	28.6	3.1	11	25.6	2.6	21	23.3	3.7	40	29.6	4.3
42	100.0	100.0	43	100.1	100.0	90	100.0	100.0	135	100.0	100.0

If the information shown in Tables 8 and 9 is juxtaposed, it can be seen that the increasing concentration of population that characterized the large towns during their second phase (1921–53) was a real one and so was the conversely observed decline of the medium and small towns because this period was least confounded by reclassification. If one were to generalize about the growth of town types over the 70-year period on the strength of Tables 8 and 9, one might even state that medium towns and especially small towns needed reclassification to maintain or increase their respective shares of the urban population. During periods when reclassification was conspicuously absent, large towns increased their share of the national urban component.

To explore whether this hypothesis had merit, I analyzed the data for the intercensal periods when reclassification could be regarded as a substantial confounding factor, then attempted to adjust the data for this bias. There are at least two ways of looking at urban growth by town type: (1) One can consider the population of a particular town type at the beginning and end of an intercensal period, regardless of

TABLE 9 Shifts in urban-place size classes during intercensal periods:

	1901–11					1911–21					1921–46	
Size class	Same number	+1	+2	New areas	All shifts	Same number	+1	+2	New areas	All shifts	Same number	+1
⩾100,000	1	0	0	0	1	1	0	0	0	1	1	0
50,000–99,999	0	0	0	0	0	0	0	0	0	0	0	4
20,000–49,999	4	0	0	0	4	4	2	0	0	6	2	2
10,000–19,999	3	1	0	2	6	4	2	0	0	6	4	8
5,000–9,999	6[a]	6	0	2	14	12	0	0	0	12	3	4
<5,000	7	0	0	5	12	12	0	0	5	17	12	0
All size classes												
Number	21	7	0	9	37	33	4	0	5	42	22	18
Percent	56.8	18.9	0.0	24.3	100.0	78.6	9.5	0.0	11.9	100.0	52.4	42.9

NOTE: Percentages may not sum to 100 because of rounding.

a Included in this number is Trincomalee, which declined by one size class.

b Included in this number is Hatton-Dikoya, which declined by one size class.

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1972: table 4).

whether a particular locality has the same size designation throughout the intercensal period, as long as the locality is defined as urban at both end points. This would yield the "apparent" growth of town type. (2) It is also possible to identify a particular locality at the beginning of an intercensal period and follow it through to the end of the period, regardless of whether it remained in the same town type. Because the focus is on the comparative performance of constant town types over time, this method yields the "real" growth of a town type and is more appropriate for assessing whether medium and small towns would have grown in the absence of reclassification. As Table 10 reveals, with the first procedure it is possible to have a different number of towns at the beginning and end of an intercensal period, whereas the second procedure does not involve this liability. Apparent growth equals real growth only when each locality of a particular town type has remained unchanged and when no additions of locality have occurred during the intercensal period.

Sri Lanka, 1901–71

			1946–53					1953–71				
+2	New areas	All shifts	Same number	+1	+2	New areas	All shifts	Same number	+1	+2	New areas	All shifts
0	0	1	1	0	0	0	1	1	2	0	0	3
0	0	4	4	2	0	0	6	4	1	0	0	5
1	0	5	3	3	0	0	6	3	8	3	12	26
1	0	13	10	5	0	0	15	6	3	1	24	34
0	0	7	2	2	0	0	4	2[b]	3	0	22	27
0	0	12	9	0	0	2	11	5	0	0	35	40
2	0	42	29	12	0	2	43	21	17	4	93	135
4.8	0.0	100.1	67.4	27.9	0.0	4.7	100.0	15.6	12.6	3.0	68.9	100.1

It becomes evident that the apparent growth measure almost systematically minimizes the growth of small towns while exaggerating the growth of medium towns, owing to the graduation of small towns into medium towns through growth and the accrual of their population to the medium towns. When compared with Table 4, Table 10 shows that only large towns (in this case the primate city of Colombo) exhibited real growth greater than the growth of the national urban population during 1901–11 (36.6 versus 31.1 percent). During 1911–21 and 1953–71, only small towns grew more than the national urban population, which increased by 17.5 percent during 1911–21, 62.7 percent during 1953–63, and 41.0 percent during 1963–71. Since all figures on national urban growth include effects of reclassification, which artificially inflate urban growth, the finding that small towns maintained higher growth during these periods after effects of reclassification are taken into account speaks well for their growth potential. Thus it is incorrect to say that small towns depended on reclassifica-

TABLE 10 Percentage of "real" and "apparent" growth of town types during three intercensal periods: Sri Lanka

Town type and type of growth	1901-11			1911-21			1953-71		
Large									
Real		36.6	(1)		15.6	(1)		45.7	(7)
Apparent	(1)	36.6	(1)	(1)	15.6	(1)	(7)	52.8	(8)
Medium									
Real		2.6	(8)		12.9	(10)		54.0	(21)
Apparent	(8)	19.3	(10)	(10)	22.6	(12)	(21)	58.7	(24)
Small									
Real		23.0	(19)		22.6	(26)		99.3	(15)
Apparent	(19)	47.7	(26)	(26)	11.3	(29)	(15)	-0.2	(11)

NOTE: Figures in parentheses represent number of towns. Those preceding percentage of apparent growth represent number of towns at the beginning of intercensal period; those following percentages represent number at end of period.

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1972: table 4).

tion to maintain or increase their share of the national urban component; this appears to be more the case with medium towns.

In the process of urbanization, the contribution of small, medium, and large cities has varied. According to several authorities, medium towns have taken the vanguard in the admittedly slow rate of urbanization that has characterized Sri Lanka during the twentieth century. Gunatilleke (1973:46), for example, states:

> On any of these definitions [population size per locality], the rate of urbanization remains low. If the minimum population size of urban units is taken as 2,000 or 5,000, the increase in the share of the urban population has been insignificant. If the dividing line is applied at 10,000 or 20,000, the urban sector shows a faster rate of expansion. *The figures reveal that the most rapid growth has taken place in the towns between 20,000 and 50,000* [emphasis added].

Dias (1977:7), paraphrasing Puvanarajan (1976), asserts that "urbanization in Sri Lanka is characterized by the dominance of medium sized urban units." Jones and Selvaratnam (1970:205) observe that "the outstanding trend is the increase in the share of the urban population living in towns in the 20,000 to 100,000 size range—from 32 percent in 1946 to 43 percent in 1960."

While agreeing with the observation that medium towns have held the lion's share of the national urban component during most of the period, I submit that the dynamics of the process of urban growth has not been adequately considered by those arriving at this general conclusion. In particular, the performance of the small towns has been neglected by reason of their definitional exclusion from the small town class due to their graduation into medium size towns at the end of the intercensal period. What need to be monitored are whether a particular town type grew, declined, or stagnated during specific periods and the comparative performance of town types. A short time span would have been desirable for this purpose, but I have been obliged by data constraints to use the intercensal period. The evidence, shown up to now from the analysis of published census data, leads me to believe that the growth performance of the small towns was of no mean caliber, even though it accounts for a small part of total urban growth.

I have stressed this point because it generates a series of policy implications having importance to Sri Lankan socioeconomic development. I shall endeavor to show that small towns have demonstrated a momentum for growth. This growth requires a concomitant growth of an infrastructure capable of supporting a burgeoning populace; included in such an infrastructure are growth of employment opportunities, educational and medical services, housing, electrification, and protected water supplies. The more rapid growth of small urban places means of course that urbanization is increasingly decentralized. Having indicated the policy relevance of this discussion, I will next examine additional evidence on the growth rates of town types, then turn to specific policy implications of the growth of small towns.

Except during the period of 1901–11, when large towns exhibited a higher rate of growth than small towns, the latter have consistently maintained a higher growth rate than either medium or large towns during every intercensal period (Table 11). The city of Colombo, the only locality represented in the largest size class, shows once again a secular decline in growth–except for the sudden spurt during 1946–53, which may have been due to Sri Lanka's gaining national independence in 1948 and the ensuing political activity concentrated in Colombo. The 50,000–99,999 class, though not existing in the first three intercensal periods, shows a much higher growth rate during the last two periods than found in Colombo; the three major suburbs of Colombo are included in this size class. Among the medium towns, the 10,000–19,999 size class displays a higher rate of growth than the 20,000–49,999 class over the period 1911–71. Among the small towns, it is the under-5,000 class that exhibits the higher rate of real growth,

TABLE 11 Annual percentage of "real" population change during intercensal periods by town type and size class: Sri Lanka, 1901–71

Town type and size class	1901–11	1911–21	1921–46	1946–53	1953–71
Large	**3.1 (1)**	**1.4 (1)**	**1.6 (1)**	**2.6 (5)**	**2.1 (7)**
≥100,000	3.1 (1)	1.4 (1)	1.6 (1)	2.3 (1)	1.5 (1)
50,000–99,999	0 (0)	0 (0)	0 (0)	3.0 (4)	2.7 (6)
Medium	**0.3 (8)**	**0.8 (10)**	**1.9 (12)**	**3.2 (18)**	**2.7 (21)**
20,000–49,999	0.8 (4)	0.4 (4)	1.9 (6)	0.5 (5)[a]	2.2 (6)
10,000–19,999	-1.1 (4)[b]	2.5 (6)	2.0 (6)	3.4 (13)	2.6 (15)
Small	**2.1 (19)**	**2.0 (26)**	**2.4 (29)**	**3.4 (18)**	**3.8 (15)**
5,000–9,999	1.7 (6)	2.1 (14)	2.3 (12)[c]	0.7 (7)	2.4 (4)
<5,000	2.5 (13)	1.7 (12)	2.6 (17)[d]	7.4 (11)[e]	4.9 (11)[f]

NOTE: Figures in parentheses represent number of towns at beginning of period.

a Trincomalee declined by 0.8 percent.

b Negambo and Trincomalee declined by 4.2 and 2.5 percent, respectively.

c Trincomalee grew by 5.0 percent.

d Ambalangoda grew by 4.4 and Beruwala by 4.7 percent.

e Minuwangoda Local Board Area is excluded because it had lost its urban status by 1953.

f Ja-ela grew by 9.7 and Awissawella by 7.4 percent.

SOURCES: Computed from Department of Census and Statistics (1958: table 4; 1972: table 4).

except during 1911–21. This trend is most pronounced during the last quarter century of the 70-year period, denoting perhaps that the trend has still not exhausted itself.

Even during the period from 1921 to 1953, when large towns experienced increased growth and there was a precipitous decline in the small towns' share of national urban growth from 20 to 5 percent (Table 8), the real growth rates maintained by small towns were higher than those of the large or medium towns. Small towns claimed a greater share of the urban population between 1953 and 1971, mainly owing to reclassification; and a similar upsurge is reflected in the real annual growth rates of small towns, even when effects of reclassification are controlled for.

PRIMACY AND METROPOLITANIZATION

In developed nations the distribution of cities by population concentration generally follows the rank-size rule—that is, it possesses a log-normal distribution. In one of the earliest formulations of the rank-size rule, Auerbach (1913) wrote that "when the largest cities of a country are ranked by size, the product of a city's rank by its size tends to be a constant" (quoted by Shryock and Siegel, 1976:100). A simplified illustration is that when a nation's second largest city is one-half the size of the largest, the third largest one-third the size of the largest city, and the fourth largest one-fourth its size, the cities show conformity to the rank-size rule. The evolution of the rank-size pattern is attributed to the nature of economic growth and is generally considered to have positive effects for the national entity (Berry and Kasarda, 1977:391).

Whenever the rank-size rule is violated and one city grows much faster than the rest of the urban centers, the situation is characterized by primacy. Primacy is indicative of a lopsided growth pattern of urban localities. In most developing countries conformity to the rank-size rule is the exception and primacy is the norm.

Primacy is associated with overurbanization, which is characterized by overutilization of a city's resources owing to an influx of migrants from other parts of the country who cannot be absorbed into the urban economy, growth of a traditional sector in the urban economy, and a transfer of rural misery into the center of the city. After investigating 87 countries, Mehta (1964:147), however, concluded that

> the "primate city" urban structure does not appear to be a function of the level of economic development, industrialization or urbanization. It is a phenomenon by no means limited to or characteristic of the underdeveloped countries of the world. Primacy appears to be to some extent a function of small areal and population size. To the extent that we were able to explore the hypothesis of the "parasitic" effect of "primate cities," the results do not warrant a clear negative judgement on primacy.

Table 12 shows the proportion of the national urban population concentrated in the capital cities of 11 countries for which data are available for the period around 1970. Although these figures do not test the rank-size rule, they do provide insight into the level of primacy of these cities.

Only two capitals (Manila and Kuala Lumpur) had lower levels of urban concentration than Colombo. It is noteworthy that the Philippines and Malaysia, like Sri Lanka, recently experienced major rural-ward resettlement and land reform either sponsored by the state or undertaken at the population's own initiative (see, for instance, Dobby, 1955, and Pryor, 1972, on Malaysia; Krinks, 1970, and Simkins and Wernstedt, 1971, on the Philippines). Indonesia, however, with its

TABLE 12 Percentage of urban population concentrated in capital cities: selected Asian countries, around 1970

City and country	Percentage of urban population
Bangkok, Thailand	41.0
Kathmandu, Nepal	32.6
Seoul, Republic of Korea	32.3
Baghdad, Iraq	32.2
Teheran, Iran	29.7
Dacca, Bangladesh	27.6
Jakarta, Indonesia	22.2
Karachi, Pakistan	21.1
Colombo, Sri Lanka	19.8
Kuala Lumpur, Malaysia	17.9
Manila, Philippines	11.4

SOURCE: United Nations *Demographic Yearbook 1976*, tables 6 and 8.

long-standing transmigration program, still shows a slightly higher level of urban concentration in Jakarta.

The concept of primacy has generally been discussed within the framework of intercity comparisons. Usually the cities are delimited according to their political-administrative boundaries, possibly for the sake of brevity and clarity. The simplicity of using such definitions carries with it the adverse effect of implicitly treating the city as a viable unit in itself. This assumption neglects the high degree of interdependence between the city, its urban fringe, the suburbs that provide services and goods for the upkeep of the city, and also the rural hinterland that supplies goods (mainly food) to the city. Nevertheless, primacy has come to be measured by one criterion, that of population size, which ignores the dependence of the city upon goods and services from the countryside. The issue of labor relations between the city and its suburbs is not easily resolved. A basic question is whether the city should be defined as what it is when it is asleep at night (as most censuses define it) or what it is during the peak hours of a normal working day. The answer to this question is crucial in Sri Lanka, where it is estimated that 45 percent of those who work within the city of Colombo commute daily from outside the city (Dias, 1977:9).

Compared with other cities of Sri Lanka, Colombo has been the primate city with regard to both population concentration and political and economic activity since around the turn of the century. It was so apparently as far back as the ninth century A.D., when Ibn Batuta, the Arab traveller, referred to Colombo as the "finest town in Serendib" (Kannangara, 1954:13), although the capital city was then Anuradhapura. (A detailed discussion of the evolution of the city of Colombo is found in Kannangara, 1954.) In 1971, Colombo still had the greatest population concentration and volume of political and economic activity of any city in the country, though its relative share of population had declined. From the turn of the century until 1953 Colombo had more than one-third of the country's urban population; during the next 18 years, because of massive reclassification and diminishing space for further expansion, Colombo's share of the national urban component declined to just under 20 percent. During the 70-year period under review, however, there was a 44 percent increase in the geographic area of Colombo through annexation; during the last 18 years of the period the increase was a moderate 4 percent. The published census data do not provide sufficient information to decipher the real decline in Colombo's share of the country's urban population. In all probability a secular decline would have occurred much earlier than in the 1950s, had it not been for the areal annexations.

A glance at Table 13, which shows the population of 23 principal towns expressed as a proportion of Colombo's population over the 70-year period, is sufficient to reaffirm the primacy of Colombo. Galle was the second largest town in Sri Lanka at the turn of the century, but Jaffna maintained this position from 1911 to 1953, when it was in turn displaced by Dehiwela-Mt. Lavinia (a suburb of Colombo). Only during 1901 was Jaffna's population just over one-fifth of Colombo's (as was the population of Galle); thereafter it declined monotonically until 1953, when it reversed the trend, ending up still less than one-fifth of Colombo's population in 1971. Since coming into existence in 1911, Dehiwela-Mt. Lavinia, on the other hand, has shown a monotonic improvement of position vis-à-vis Colombo, ending with just over one-quarter of Colombo's population. With few exceptions,[1] the principal towns have improved their positions with respect to Colombo over the 70-year period. Considering that their relative growth occurred at a time when areal annexations to the city of Colombo were in the order of 11.4 sq. km. (4.4 sq. mi.)–probably an advantage that

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[1] The notable exceptions are Kalutara, Matara, Galle, and Hambantota, situated in the southern maritime districts to which they have given their names, and Jaffna, the northern maritime district, all of which have registered net out-migration from their districts during the three intercensal periods between 1946 and 1971 (ESCAP, 1975:32–4).

TABLE 13 Population of principal towns, expressed as a proportion of the population of the city of Colombo: Sri Lanka, census years 1901–71

Principal town	1901	1911	1921	1946	1953	1963	1971
Colombo	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Dehiwela-Mt. Lavinia	na	.087	.104	.157	.184	.217	.275
Jaffna	.219	.191	.174	.173	.183	.185	.192
Moratuwa	.191	.128	.117	.140	.141	.152	.172
Kandy	.171	.142	.133	.142	.134	.133	.167
Kotte	na	.048	.059	.111	.128	.143	.164
Galle	.240	.189	.160	.135	.131	.128	.129
Negambo	.128	.061	.087	.090	.091	.092	.102
Trincomalee	.073	.042	.039	.090	.062	.068	.074
Matara	.077	.066	.068	.063	.065	.064	.065
Batticaloa	.064	.050	.043	.036	.041	.045	.065
Anuradhapura	.024	.025	.032	.034	.043	.058	.062
Badulla	.038	.031	.033	.037	.040	.053	.062
Matale	.032	.027	.032	.039	.040	.050	.055
Ratnapura	.026	.026	.029	.034	.039	.042	.052
Kalutara	.074	.062	.056	.052	.048	.049	.051
Kurunegala	.042	.039	.042	.037	.041	.041	.045
Puttalam	.033	.028	.028	.022	.024	.026	.032
Chilaw	.027	.024	.027	.025	.027	.028	.031
Nuwara Eliya	.032	.035	.031	.030	.034	.030	.029
Vavuniya	.004	.004	.003	u	u	.014	.028
Kegalle	.015	.012	.014	.014	.013	.022	.024
Mannar	.034	.018	.015	u	u	.018	.020
Hambantota	.018	.015	.012	.011	.010	.010	.012

na–not applicable because this town did not exist in 1901.

u–unavailable.

SOURCE: Computed from Department of Census and Statistics (1974: table 26).

none of the other principal towns enjoyed–the growth performance of the other principal towns is impressive. Because continued urban growth is a nearly universal phenomenon and decentralized urbanization is more desirable than a highly concentrated pattern of urban growth, which commonly results in overurbanization and infrastructural breakdowns, the growth of the principal towns of Sri Lanka can be viewed as manifesting a perhaps unintended process of decentralized urbanization resulting from public investment policies (especially in peasant agriculture) and welfare measures pursued by the government.

The intercity comparison does not do justice to the continuous urban sprawl around the city of Colombo. The greater Colombo area, or metropolitan Colombo as this urban sprawl is called, has exhibited higher rates of growth than the restricted area of the city of Colombo. The definition of metropolitan Colombo has changed over time, however. As Jones and Selvaratnam (1970:205) have observed,

> the ideal estimates of the growth of the metropolitan population would perhaps require a moving boundary, to incorporate localities into the metropolitan area at the time they reached suburban status in terms of criteria such as density, occupational structure and commuting patterns. Failing this, however, the use of a fixed boundary for the metropolitan area that appropriately defines the metropolitan area as of the terminal point of the study, although it tends to exaggerate the metropolitan population at the beginning of the period and hence to *understate* its rate of growth, brings us a step closer to reality.

The procedure adopted by Jones and Selvaratnam is somewhat similar to the identification of standard urban areas (SUA) used in the Indian census of 1971 (Bose, 1974); but whereas in India the SUA were the projected growth areas of the metropolis from 1971 to 1991, the method adopted by Jones and Selvaratnam is a post hoc operation to define the metropolitan area at a previous time.

Jones and Selvaratnam (1970) made two estimates of the Colombo metropolitan population, one including the Colombo Divisional Revenue Officer's Division only, the other also including "a few adjoining Urban Councils and Town Councils that are in reality, suburban areas of the Colombo metropolis" (p. 205). Table 14, which draws on the spatial units adopted by Jones and Selvaratnam but uses data from ESCAP, reveals that the population of metropolitan Colombo was almost double that of the city in 1971 and that its rates of growth were much higher than that of Colombo City during the period between 1946 and 1971. It also shows that, irrespective of the geographic area considered, the share of the urban population and its rates of growth declined over the period. The growth rate of the metropolitan area (both definitions) was almost equal to the national growth rate during 1953–63 and 1963–71. (In 1953–63 the national rate was 27 per 1,000; in 1963–71, it was 23, as shown in Table 6.) As Jones and Selvaratnam (1970:208) assert, these figures "certainly do not point to any marked 'metropolitanization' of Ceylon's population."

TABLE 14 Estimated population, average annual growth rate per 1,000, percentage of total urban population, and percentage of total national population: city of Colombo and Colombo metropolitan area, census years 1946–71

Measure	City of Colombo	Colombo DRO's Division[a]	Colombo DRO's Division + surrounding towns[b]
Estimated population			
1946	362,074	525,586	614,837
1953	426,127	656,152	783,213
1963	511,644	846,401	1,036,141
1971	562,420	1,002,779	1,239,712
Annual growth rate			
1946–53	24	32	35
1953–63	18	25	28
1963–71	11	21	22
Percentage of total urban population			
1946	35.4	51.4	60.1
1953	34.4	53.0	63.2
1963	25.4	42.0	51.4
1971	19.7	35.0	43.4
Percentage of total national population			
1946	5.4	7.9	9.2
1953	5.3	8.1	9.7
1963	4.8	8.0	9.8
1971	4.4	7.9	9.7

[a] DRO's (Divisional Revenue Officer's) Division is a subadministrative spatial unit within a district. Colombo DRO's Division is a contiguous area encompassing the whole city of Colombo plus some parts of its suburbs.

[b] Includes "a few adjoining Urban Councils and Town Councils that are, in reality, suburban areas of the Colombo metropolis" (Jones and Selvaratnam, 1970:205).

SOURCE: ESCAP (1976: table 55).

FACTORS AFFECTING SRI LANKA'S PATTERN OF URBANIZATION

Whatever definition one may use of "urban," what emerges from the foregoing analysis is the slow rate of urbanization in Sri Lanka. The chronic overgrowth of urban localities commonly found in other developing countries is conspicuously absent in Sri Lanka. Examination of the possible determinants of the slower growth rate and pattern of urbanization is therefore in order.

ESCAP (1976:74–6) has alluded to six major factors that may have influenced the pattern of urbanization in Sri Lanka, mainly during the period following World War II, although they do not constitute an exhaustive list. These conditions are paraphrased and elaborated below because my findings tend to support them.

1. Population concentration in Sri Lanka has resulted mainly from the growth of commerce and trade rather than from industrialization. To this day, Colombo is best characterized as a service center rather than a seat of burgeoning industry. The post World War II period saw a steady worsening of the terms of trade for tea, rubber, and coconut exports, the life-line of the economy. Consequent balance-of-payments problems led to restrictions on trade activities that possibly led to a lower rate of employment generation, which in turn may have stemmed the tide of urbanward migration.

2. Rudimentary processing involved in the exportation of tea and rubber was carried out on the plantations themselves. Sporadic attempts at industrialization occurred almost exclusively under the directive of the government rather than the private sector. In establishing such enterprises as cement, ceramics, paper, and plywood factories, the government pursued a policy of decentralized industrialization, locating the factories in close proximity to raw material resources. The absence of a nucleus of industrial activity may have had a negative effect on the rate of urbanization and influenced the pattern of urbanization.

3. Perhaps the single most pervasive public investment policy pursued by successive governments of post-independent Sri Lanka has been the continued encouragement of peasant agriculture. Ancient irrigation schemes were resuscitated and arable land in the dry zone of the country was colonized and resettled by the land-hungry peasants of the wet zone. The continued stream of lifetime migration that resulted from fairly attractive inducements held out by the government is reflected in interdistrict net migration statistics (Abeysekera, 1979). A few statistics suggest the magnitude of investment, the incentives held out by the government, the response of the peasantry, and the dynamism that was created in the peasant sector. During 1950–51 to 1970–71, just over 300,000 hectares of new land were brought under paddy cultivation, absorbing an additional 291,000 people into the labor force. (Meanwhile tea, rubber, and coconut could not hold on to their existing labor force and had to cut back by about 10,000 people.)

Rice production increased by 200 percent and the productivity per hectare as well as per worker rose by about 70 percent during the period (ESCAP, 1975). Throughout most of this period the government offered farmers a guaranteed price for their produce, approximately 50 percent above the current world market prices. The policy facilitated a major income redistribution as well as helping to reduce the volume of rice importation needed for the heavily government-subsidized rice ration. The net result was to create a viable alternative destination for persons who might have been attracted to urban areas that were not exhibiting major economic expansion.

4. The dynamism experienced in the peasant sector would not have taken place with as much vigor if structural bottlenecks such as insecurity of land tenure, an impoverished landless proletariat, and blatant expropriation by landlords were prevalent in the social and economic relations of landowners and peasants. As Gunatilleke (1973:62) has pointed out, Sri Lanka "did not experience the worst forms of landlordism prevalent in some other Asian countries" and "there has also been no significant capitalist enterprise in this segment of the rural agricultural sector in which peasant farming predominated." The absence of such inhibitive characteristics undoubtedly facilitated the government's successful investment in peasant agriculture, creating the necessary (though perhaps not the sufficient) conditions to stem an exodus of rural population into the already overcrowded cities.

5. It was not only through direct measures like the guaranteed price scheme that the government tried to achieve redistributive justice on a national scale. Commitment to the ideals of progressive direct taxation, subsidization of essential commodity items, and the levy of higher taxes on luxury items saw the burden of public expenditure shifted from the poor to the middle and upper classes. An increasing proportion of public expenditure was directed to investment in peasant agriculture, the establishment and strengthening of free education, and free medical services. These measures had the effect of reducing the difference in living standards between rural and urban areas, and helped to suppress the "push" on rural people to migrate to urban centers.

6. A well-developed network of state-owned roads and railways has made travel within the country convenient as well as inexpensive. Employment seekers from rural areas are able to commute to cities from their homes rather than having to migrate to cities in anticipation of securing jobs. Jones and Selvaratnam (1970:210) have observed that the great bulk of the rural population lives within 30 miles of a town

of 20,000 or more people and has relatively frequent contacts with it. Thus, owing to the proximity of rural and urban areas and to the socioeconomic effects of income redistribution programs and the activities of the welfare state, the rural-urban dichotomy is less sharp in Sri Lanka than in many other countries of Asia.

SOCIOECONOMIC DEVELOPMENT, URBANIZATION, AND SMALL TOWNS

The close association between industrialization and urbanization in the Western experience has given rise to the widespread expectation of a similar association between socioeconomic development and urbanization (Davis and Golden, 1954). Although the initial formulation of this thesis by Davis and Golden has been criticized and modified by others (Schnore, 1961; Sovani, 1964; Kamerschen, 1969; Hill, 1974), the thesis has remained basically unchanged; the relationship between development and urbanization may not be as stable over time as it was originally thought to be, but there is still an unmistakable clustering of development indicators and urbanization. Thus, from a policy point of view, the thesis posits that there is a strong rationale for encouraging urbanization in the less developed countries because development will follow on its heels.

The issue is not so simply resolved, for urbanization manifests itself in different forms and these varying patterns may be determined by, as well as have consequences for, the development of the polity. Two patterns of urbanization have been identified that are not necessarily exclusive of each other First is the growth of one (or very few) large cities whose primacy towers above the miniature population concentrations. The second pattern has an auxiliary set of urban concentrations scattered throughout the country that possess a growth momentum of their own and inhibit the primacy of one major city. There are advocates of each of these patterns of urbanization; proponents of the first type of polarized growth insist that primacy is a prerequisite for a Rostowian type of economic takeoff which, when reached, will precipitate a process of diffusion from the primate city to areas lagging behind. Brutzkus (1975:644–5), on the other hand, provides a counter-rationale for not fostering a pattern of polarized urbanization that stems from the socioeconomic conditions generally prevailing in less developed countries.

> A polarized urban pattern is not favorable to advancement in the most urgent and neglected spheres of development (increasing agricultural production) nor is it favorable for the fuller or better utilization of natural resources. It is not in line

> with the development of raw-material-oriented basic heavy industry and probably even not too favorable to labor-oriented manufacturing industry with serious prospects of exports.

Polarized urban growth in less developed countries with domineering primacy has been observed to be closely correlated with overurbanization. As Wellisz (1971:44) has argued, overurbanization "stands for a perverse stream of migration, sapping the economic strength of the hinterland, without correspondingly large benefits to urban production. Instead of being a sign of development, overurbanization is a sign of economic illness." Wellisz also points out that the policies pursued by governments of the less developed countries have an inherent bias in favor of urban areas while neglecting the hinterland and so generate an uneconomically fast rate of urbanization.

Brutzkus (1975) emphasizes that polarized urban growth is almost a natural form of urbanization, that anything short of a determined effort on the part of the government to decentralize urbanization will result in enhancing primacy. He agrees with Myrdal's "postulate of perpetuating and self-increasing regional disparities under a regime close to 'lassez faire, laissez passer' in regional policy" (638–9).

If, as Brutzkus strives to establish, decentralized urbanization is a better option for the less developed countries, what is capable of generating such a process? Well-intended policies can be ineffective in yielding the results aimed for. The focus therefore should be on both the intent of the policies pursued and their effects as manifested in socioeconomic reality. According to Desmond (1971:69–70),

> the key questions then are which policies and decisions have the strongest effect on investment, employment, and incomes, and what can be said about the current development policies of countries in the region [Asia] with regard to probable distribution of income opportunities. A final question is whether decision-makers are likely to be responsive to locational policies which stem from a conscious desire to control the rate and structure of urban growth if these policies are felt to be inconsistent with income-maximizing objectives.

I have already alluded to the role played by the Sri Lankan government's investment policy in the peasant sector and need not reiterate it here. However, lest the investment policy be construed as a purely magnanimous gesture on the part of the political elite, emanating from fortuitous circumstances, some elaboration of the historical, topographical, political, and economic intricacies that gave rise to the policy is in order.

Historically, Sri Lanka has been a hydraulic society par excellence, peasant agriculture being the predominant mode of livelihood of the people. The state of disrepair in which the irrigation schemes of the dry zone lay for centuries had clustered the populace into the climatically more viable wet zone, causing demographic pressure on its resource structure; and, in the absence of significant inputs of improved technology and agricultural practices, the resource structure of the wet zone tended to be stagnant. The situation at the turn of the century was essentially one of uncombined resources and the need for a rationale for combining them. Arable land was available in the dry zone, but there were no people to cultivate it and not enough irrigation. As long as tea and rubber exports were capable of creating the foreign exchange needed to import enough food to keep the country fed, the Ricardian theory of comparative advantage was demonstrated to perfection. Convulsions in the economy were first felt when World War I broke out and interrupted the food importation; these events challenged British naval hegemony and threatened to plunge the country into starvation.

During this period Ceylonese nationalism was gathering momentum, fanned by liberal ideologies adopted by the "England returneds" who sought self-government. In search of an economic and cultural ideology counter to that of the British, they turned to the heritage of the "glorious hydraulic past" for legitimacy. With the advent of limited self-government under the Donoughmore Constitution, the national political elite increasingly assumed the role of Robin Hood, clamoring for concessions for the people. World War II saw *Pax Britannica* seriously challenged, further disruptions in food imports, and the establishment of a legitimate rationale for the welfare state. Free education, free medical care, and subsidized food were its main features.

The issue of the food subsidy has, from the time of independence in 1948, been in the limelight of the political arena; any threat to its continuance has been intimately connected with political catastrophe. With the secular decline in the terms of trade from tea, rubber, and coconut exports, each successive government has had to resort to deficit financing to import rice for distribution to the people at prices well below cost, thus ensuring eventual bankruptcy. This unfortunate situation provides the background for the government's continued policy in peasant agriculture, a policy shaped by the political elites' accountability to the electorate. Although articulate and militant, the numerically smaller urban working class and the middle class have much less political clout than the peasantry in the general elections. The maintenance of direct or indirect income-transference programs benefiting the peasantry has been the *sine qua non* of political viability.

It is within this briefly sketched context that the process of urbanization in Sri Lanka has to be viewed. The decentralized pattern or urbanization entailing the growth of small towns is a joint result of the political accountability of the elite to the masses, adverse terms of trade, and an impressive response on the part of the peasantry to market incentives. It is possible that enhanced trading activity that took place because of dynamism generated in the peasant sector, coupled with such welfare measures as the establishment of schools, dispensaries, post offices, and police stations in central villages, may have contributed to the growth of small towns that were gradually granted urban status. In the absence of more detailed information on the environmental conditions of the small towns, it is not possible to test this hypothesis.

It must be noted, however, that not all small towns granted urban status by ministerial decree exhibited similar growth potential; in fact, some remained stagnant. Kadugannawa Urban Council, with 1,562 people in 1971, is such an extreme case. In formulating urban policies for the future, it might be pertinent to examine the historical, economic, communication, and political configuration that inhibits or enhances population concentration. Perhaps one covariant of the degree of population concentration that is likely to display great predictive potential is the changing occupational and industrial composition of the population in an urbanizing locality. Although there have been changes in the definition of "economically active population" from 1946 onward, as well as confusion arising from the use of different classification systems, it would be productive to monitor the changes in occupational and industrial composition along with changes in population concentration over time. To the extent that data on economic activity have been collected, the period of comparison may profitably be extended to cover the 1901, 1911, and 1921 censuses.

Although I have presented some evidence to demonstrate that small towns in Sri Lanka have grown as much or more than the medium and large towns, this analysis stops with urban areas as defined in 1953. Published data were not available for 1963 to follow the growth performance of nearly 50 newly reclassified urban localities, most of which presumably started as small towns. Furthermore, I have not systematically taken into account the effects of annexations and deletions, although I have tried to control for effects of reclassification. Decomposition of urban growth into its components of natural increase and net migration, with definitional and classification changes controlled for, would provide further insights into the patterns of growth associated with town types. Possible influences of the age-sex structure of town types should also be brought into the analysis.

Sri Lanka probably has not had a deliberate policy of decentralized urbanization. But the incipient pattern of decentralized urbanization that has materialized on the national canvas does reflect a public investment policy that has striven to reach the rural hinterland rather than exhaust itself in serving the primate city and its suburbs. It is difficult to predict how long this trend can be sustained on continued investment in agriculture alone. Given a basic level of prosperity of the peasantry through increased agricultural productivity, perhaps the next step is a gradual diversification into cottage and light industries at the grass-roots level and on a concerted scale. Such diversification will necessitate the creation of a domestic market and possibly foreign markets which were not required in the case of agriculture because it has operated within the context of an unsaturated domestic market.

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